SPECIFICATIONS

FOR

PRACTICAL ARCHITECTURE.

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A GUIDE

TO THE

Architect, Engineer, Surveyor, and Builder,

WITH AN

ESSAY ON THE STRUCTURE AND SCIENCE OF MODERN BUILDINGS.

UPON THE BASIS OF THE WORK BY ALFRED BARTHOLOMEW, THOROUGHLY REVISED, CORRECTED, AND GREATLY ADDED TO,

BY

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Second Edition, Revised, with Additions.

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PREFACE.

A VOLUME of Specifications of a practical character being greatly required, and the old standard work of Alfred Bartholomew being out of print, I have taken his work as my basis, and have struck out and altered the preliminary matter, so as to make it more adapted to modern science and requirements.

The Specifications I have so altered as to bring in the now universal use of concrete, the more general use of drainage, the use of iron, glass, asphalte, and other material.

Where it has seemed to me to be necessary, I have inserted Specifications of works that have been erected in my own practice, and I have added a form for General Conditions and an Agreement.

I am confident that the work will be useful in the office of Architects, and all those who have the pleasure or necessity to build.

The whole work is published at a price and in a form that renders it easily attainable, and I hope that my endeavours will lighten the labours of very many of my brethren in the art of Architecture.

NOTE TO SECOND EDITION.

The Author, in preparing this new Edition, has carefully revised the work, and made certain additions which have been rendered necessary by the introduction of new systems of building and the greater attention which in these days is given to hygienic matters.

Chapter XXVII. has been re-written, giving an entirely new Workhouse Specification.

The Regulations of the Metropolitan Board of Works with reference to Concrete Buildings, which in themselves constitute a good Specification of this kind of work; and also the heads of a Building Contract agreed upon between the Royal Institute of British Architects and the London Builders' Society, have been inserted, and it is believed will be found valuable.

FREDK. ROGERS.

89, Chancery Lane,

March, 1886.

THOMAS F. M. SMITH
ARCHITECT,
FOOTSCRAY.

CONTENTS.

PART I.

PAGE

EXACTNESS OF DRAWINGS AND SPECIFICATIONS 1
DISPUTES ARISING FROM BADLY DRAWN SPECIFICATIONS 2
TROUBLE AND VEXATION FROM A BADLY DRAWN SPECIFICATION . . . 2
MARGINAL REFERENCES 3
COPIES OF DRAWINGS AND SPECIFICATIONS FOR REFERENCE 4
DEPRESSING INFLUENCE ON ARCHITECTURE OF BAD BUILDING 5
INFLUENCE OF CONTRACTING ON ARCHITECTURE 5
SURETIES TO A CONTRACT 6
PRESENT STATE OF ARCHITECTURAL MECHANICAL KNOWLEDGE 7
IMPROVEMENTS IN OPERATIVE MACHINERY 7
EXCELLENCE OF MATERIAL IN MODERN TIMES 8
HAVE WE IMPROVED IN OUR PRACTICAL BUILDING? 8
BAD MODERN NATIONAL POLICY OF DISCOURAGING PUBLIC WORKS AND USEFUL ARTS 9
SOME LAWS WHICH FURTHER TEND TO DEPRESS ENGLISH ARCHITECTURE . . 10
DEFECTS IN BUILDINGS FROM INSUFFICIENT EDUCATION 11
FOUNDATIONS 12
MASONRY 13
CRAMPS AND PLUGS IN MASONRY 14
USE OF IRON IN STONE AND BRICKWORK 18
INJURY FROM USE OF BATH STONE 19
EXTRA CAUTION REQUIRED WITH SQUARE STONE 20
QUANTITY OF MATERIAL IN A BUILDING 21
IMPROPER MATERIALS USED FOR DURATION 22
INJURY FROM TIMBER IN AN IMPROPER STATE 23
CARELESS USE OF COMBUSTIBLE MATERIALS IN PUBLIC BUILDINGS . . . 24
INFERIORITY OF MODERN BRICKWORK 30
GEOMETRICAL SCIENCE IN ARCHITECTURE 33
THREE GREAT CONSTRUCTIVE PRINCIPLES IN ARCHITECTURE 36
SIMPLE REPOSE IN CONSTRUCTION 37
EQUIPOISE IN CONSTRUCTION 37
TIE IN CONSTRUCTION 40
UNION OF SEVERAL GREAT PRINCIPLES IN CONSTRUCTION 41
GRAVITY THE SOURCE OF ALL PRINCIPLE AND DEFECTS IN CONSTRUCTION . 42
THREE MODES IN WHICH GRAVITY ACTS 43
ON THE MECHANICAL TRUSSING OF BUILDINGS 45
ABUTMENTS 49
BUT A SMALL PORTION OF THE MATERIALS IN MODERN EDIFICES PERFORMS THE INTENDED DUTY 53
THE EXCELLENCE OF GOTHIC ARCHES 54

PAGE

Defects from the use of Gothic Arches 56
Observations on Roofs and Gutters 57
Use and Abuse of Timber Partitions 59
Bressummers in Buildings, and their Abuse 60
Faulty Method of covering External Apertures 61
Abuses in the Formation of Entablatures 65
On neglecting other Branches for Architectural Drawing . . . 66
All Materials should form Part of the Structural Strength . . 67
Neglect of Dynamics a Cause of Instability 71
Little Knowledge possessed regarding Chimneys 72
Architects not Scientific Men 72
The Resources still left to the English Architect 73

PART II.

PAGE

Chapter I. Specification for a Small Dwelling House . . 75
,, II. ,, ,, ,, and Shop 92
,, III. ,, ,, ,, and Offices 108
,, IV. ,, ,, Public House and Dwelling House 128
,, V. ,, ,, Finishing a House 141
,, VI. ,, ,, Additional Story to House . . 147
,, VII. ,, ,, A new Parlour and Kitchen . . 166
,, VIII. ,, ,, Attic Story and Flat . . . 178
,, IX. ,, ,, General Reparation of House . 191
,, X. ,, ,, Repairs of Roof 203
,, XI. ,, ,, Labourer's Cottage 210
,, XII. ,, ,, Cottage 217
,, XIII. ,, ,, Small Lodge or Cottage . . . 223
,, XIV. ,, ,, Park or Garden Wall . . . 230
,, XV. ,, ,, Palisading with Gates . . . 234
,, XVI. ,, ,, Additional Wing to Villa . . 238
,, XVII. ,, ,, Mansion 261
,, XVIII. ,, ,, Villa Residence 279
,, XIX. ,, ,, Rectory House 304
,, XX. ,, ,, Rectory House 320
,, XXI. ,, ,, New Church 337
,, XXII. ,, ,, New Roof to a Church . . . 345
,, XXIII. ,, ,, Rebuilding upper part of Tower of Church 349
,, XXIV. ,, ,, Transepts and Chancel, and Repairs to Church 356
,, XXV. ,, ,, New Schools and Master's House . 374
,, XXVI. ,, ,, Farm Buildings 383
,, XXVII. ,, ,, Workhouse 389

APPENDIX.

Concrete Buildings 403
Building Contracts 405

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PART THE FIRST.

REMARKS ON THE STRUCTURE AND SCIENCE OF MODERN BUILDINGS.

Of the exactness requisite in the practical profession of architecture, and how far it is influenced by the correctness of specifications and working-drawings.

THE whole course of practical architecture requires, in all its details, the most minute and indefatigable exactness of execution: the architect cannot plead therefore want of method and exactness in the measures which it is his business to take for the proper direction of the artificers who are to act in pursuance of his mandates; and hardly can he with any grace call to account those under him who have, perhaps, acted with more precision than himself.

While, from the great influx of young professors to the building art, there are now almost more professors than buildings to execute, it is to be lamented that out of that number so many have not received the benefit of an education so liberal as is required by an art needing such a fund of literary as well as practical knowledge. Without critical knowledge of the nature of the words, it is impossible that the practical architect can, in a specification, to be put into the builder's hands, so describe and so define his intentions that they can be executed. The author has seen many specifications which, besides having their sentences grossly ill-constructed and ungrammatical, were otherwise so obscure in their phraseology as to render it impossible to understand the intentions of the writers.

It should be the glory of an architect's specification that it be so clear that the builders, who are estimating from it the probable cost of the intended work, may have to ask no questions; that the specification contain an exact, comprehensive, and proper description of the work as it really *can* be, and as it *ought* to be executed, omitting nothing whatever which the architect's practical knowledge, experience, and foresight may tell him must be included in the work; that the words of it be so chosen and be so arranged that there be not the shadow of a doubt or ambiguity in any part of it, and that the whole of the intended work be completed without extra charge for things negligently omitted and without the possibility of a dispute upon the construction of any of the words of the specification.

The architect has too frequently, the unpleasant reflection, that want of accuracy in the execution of his work is more his own fault than that of the operators, from his drawings and specifications not being made with the precision sufficient to insure exactness of execution. With every possible care, accidental mistakes will still occur; and whoever has busied himself in the admeasurement of existing buildings well knows how very few of them will, in this respect, bear the test of actual admeasurement. It is not sufficient for him to trust to the clerk-of-the-works, or to his own clerk (unless the clerk be the real architect), or to the foreman of the works; if the architect will not himself take the trouble to examine the dimensions of the work while the foundation of it is being laid, and constantly from time to time afterwards, he may be certain of finding, to his annoyance, some mistake or other which will greatly trouble him, and that perhaps in some prominent decorative part of the work.

Of the disputes and expenses which arise from badly drawn specifications.

Almost solely from sufficient pains not being taken in drawing the specifications for buildings, and from a want of proper foresight, may be traced most of the disputes between the builder, the architect and the employer which so often occur, and which lead to excessively and even ruinously expensive law-suits and arbitrations, leaving results that are unsatisfactory to all parties.

The turn of a phrase, the situation of a single word, the causing or the avoidance of a possible ambiguity, may sometimes involve the question of many hundreds and of even many thousands of pounds; while it ought to be the duty of the professional man to take care that when a contract is entered into no disappointment may ever occur as to how much work the builder has to perform, and how much money the employer shall have to pay for that work.

Indeed, oft-times it is only owing to the circumstance of the contractor for the execution of a building not having sufficient education that he does not detect the loop-holes which a man possessing the requisite technical knowledge of education, can frequently discover in a badly drawn specification.

Of the trouble and vexation which an architect occasions to himself by a badly drawn specification; and on the propriety of general clauses in specifications.

Sometimes a careless or incompetent professional man, knowing the flimsy nature of the *specific* part of his *specification*,

will intrench himself behind a host of strong general clauses, which indeed assert that the work must be finished in some way or other to his satisfaction; but if such a professor would only reckon the time occupied in disputes; the trouble to himself in from time, to time discovering what were his real intentions, if they were indeed ever developed to himself, and in giving the subsequent explanations, as well verbal as written,—he will find, that the saving of a little time and pains in the first instance will, in the end, cause him an infinitude of extra trouble, in addition to which, if he be an irritable man, he will be kept in a constant state of feverish excitement with the builder,—he will have many disputes with him; and the builder, thinking himself injured, will probably involve the whole matter in a law-suit. Nor are there wanting many cases in which the architect, through such carelessness, has lost a valued patron's employment.

Except for the mere *manner* of the work, the author does not think that strong general clauses are just; and he never inserts them, unless he has previously included in the *particular description* every thing which he believes the building can require; indeed, he cannot think it borders upon honesty to involve, perhaps in bankruptcy, the builder, who, like all laborers, is worthy of his hire, by rendering him ignorantly liable to perform to the detriment of his family and his creditors, and to the scandal of society, that work, of whosenature, at the time of the signing of the contract the architect himself has not had a clear idea.

Of marginal references in specifications and contracts, their convenience, and their tendency to insure the correct performance of the work; and of the care with which specifications should be copied in contracts.

Above all, it is recommended that every specification have added to it a complete set of marginal references: the adding of these will cause the architect no extra trouble, if done while he is composing the work; they will rather serve him as an amusement, as he is preparing his mind to go into some other part of his labor; or if any thing cross his mind, which he knows must be inserted in some other part of the specification, he can place the name of the subject *forward* in the margin, so as to insert the particular matter in its proper place, and thus not forget that which perhaps it may be of the highest importance should not be forgotten: indeed, in addition to the above mode of helping his memory, the author has always at his side, while composing a specification, a slip of paper upon which he writes a list of all such things as occur to him out of place, but which he might otherwise not remember in place; and after the draft appears otherwise complete, he reviews the whole of it, and if any thing in the memorandum

should be found omitted in the specification, he then inserts it. By this means he very rarely finds any thing forgotten; and without his having to overstrain his words, which an honest conscientious man would think unjust, he finds the contractors in general cheerfully complete their work, without observation, and without asking for any amplification or extra payment.

Without marginal notes, the architect himself cannot readily turn to such particular parts of the specification as he may require to read or to explain; and in addition to that inconvenience, he will often find, that neither the clerk-of-the-works, nor his own clerk, has found the particular material directions till after the work is performed, and then it will be too late to make the requisite amendment, either from time not permitting, or from the utter impossibility of doing so without a re-construction of the whole building.

In one thing the architect must not spare his pains. If the contract be drawn up by an attorney it is absolutely requisite, that the architect should very diligently read over, examine and correct the copy of his specification, as inserted in the contract; otherwise he will afterwards find, to his great mortification, that it contains many of the most strange and oft-times ludicrous errors, which the copyist, from the want of the requisite technical knowledge, will not have previously corrected.

Of the advantages which would result, if copies of the working-drawings and specifications for all public works, were deposited somewhere for public and private reference.

It would tend greatly to the acquisition of general practical architectural knowledge, if by act of parliament, copies of all the working-drawings and specifications for the building of all churches and other public works were deposited in the British Museum, or some other place rendered fire-proof, for public access and examination: this would also prove of infinite use to those architects who might afterwards have to repair or restore public buildings; and it would besides insure strict integrity in the carrying on of every part of the work, from the fear of detection in case of scrutiny; it would tend to purge the profession from all incompetent and dishonorable practitioners, from the fear of exposure of ignorance or dishonesty by such public documents; and it would enable the scientific man to possess printed copies of all important and valuable documents, relative to executed works.

Of the evil and depressing influence which bad building has upon architecture.

The injury of bad building is not confined to itself, but, by the influence of evil example, effects the total ruin of a noble art. Proprietors, for the most part, unable to discriminate between good and bad building,—between correct and imperfect architecture,—between confusion of style and purity,—between durable and profitable materials and those the reverse,—between sound and wise construction and reckless mal-formation,—between the secrets of mathematical tie and equipoise and thrust,—and between seeming economy and practical economy; influenced by false appearances—believing the stability and propriety of all that is sanctioned by *a professor*—they are sometimes ready to give into all that is practically extravagant, absurd, and disastrous; and frequently the more clever they are upon ordinary subjects, the more rash are they in practical architecture, from not considering sufficiently the duration of different materials, their toughness, strength, stiffness, and weight, or the exposure to which they may be subjected.

Of the influence which contracting for the erection of buildings has upon architecture.

As if modern buildings were not designed slightly enough, as if the spirit for good building were not otherwise sufficiently depressed, as if the quantity of science employed in English architecture were not sufficiently low, to the other evils is added, in an eminent degree, that of bad execution in an enormous number of cases: and this results almost entirely from the work being performed by contract.

It is not that a contract ought to insure or does insure the bad execution of the work; but the party with whom the contract is made may and does in many instances so insure it. Formerly, many of the noblest and most intricate works were executed by contract; the astonishing stone roofs of King's College Chapel at Cambridge, and Saint George's Chapel at Windsor were so performed; they were "*workmanly wrought made and sette up* "*after the best handlynge and forme of good workmanship*, "*according to a plat thereof made and signed*," the contractors agreeing that they "*shall provide and fynd at their costs and* "*charges as moche good sufficient hable ston*," "*with lyme, sand,* "*scaffolding, cinctores, moles, ordinaunces, &c.*" as should be necessary. But then a contractor who would *deal faithfully* was found, and was employed *because he would so deal*, and *deal so he did*, and his work is become a proverb in the land; at home and abroad, the Englishman is proud of it; he likes to possess de-

lineations of it; and were it by any accident destroyed he would be uneasy till a restoration of it were attempted.

A contractor is rarely *now* employed because he is known to be a skilful and a faithful man; a public advertisement is put forth, and except in such undertakings as are only within the ability of a very few large capitalists, this acts as a warning to most solvent and trustworthy tradesmen to keep aloof, while it acts as a call to the needy, the broken-down, the incompetent, and the dishonest.

Though frequently the employers and trustees, are merchants or tradesmen, or are acquainted with mercantile pursuits, and know that a needy man without capital or credit buys dearly, though they know that embarrassment destroys the ability to execute, still is the broken-down or the fraudulent entrusted with the execution of a great work; he brings a ramification of sureties of his own kind; his creditors are eventually defrauded; and though the work may have cost somebody much more than the amount of the consideration of the contract, still the materials and workmanship, are generally of such a description as to bring a real loss to the proprietors, and to mortify and make them ashamed. Public committees are fond of punishing public contractors; but they forget that in inviting such men they assist them in their frauds. All public committees should consider that they are in some sort a branch of their country's police and that fraud is better prevented by discouraging it than by punishing it.

Of sureties to a contract.

It is certain that almost all well-executed work has been done either without contract or by contract without sureties; while it is equally certain that nearly all work badly executed by contract has been performed with the safeguard of sureties.

It may be taken as a general rule, that if a man cannot perform work excellently without them neither contract nor suretyship will compel him to do so; he may perform something, but he will not execute the spirit of the contract.

If a man need security he ought not to be entrusted; and yet even public committees are sometimes so eager to secure the bait of a low tender that they have instantly required the signature of a conditional agreement to subsist while the contract is being prepared, yet have found the very next day the character of the contractor is such as should be avoided.

How virtuous is the advice of Solomon against suretyship: it may at first seem hard that an honest man should not obtain it from his dearest friend; but were not the present artificial system in use no surety would be required of such a man; and should unforseen misfortune overtake honest integrity, the consequent

default would fall lightly and would fall seldom: but at present the most vicious and least trustworthy is employed, because he brings the guarantee of those relations whom he has already half-ruined by his recklessness or his fraud, but whose nearness of kin forbids their refusing him that suretyship which they know from experience will be forfeited. Thus that which is intended to prevent fraud is the most powerful engine of fraud and ruin; while it keeps from employment the honest man who either cannot or will not obtain it. If only men of character were employed on public works rarely would guarantees be found requisite; and even in public contracts if such a failure did take place the public could better make good such an occasional default than call upon the private purse of the surety to be employed in default of the reckless estimator.

Of the present state of architectural mechanical knowledge.

Perhaps at no age of the world, was there ever such an abundance of practical and theoretical mechanical knowledge, applicable to architecture, within the reach of every one as at present: we know how to truss roofs, floors and other members of buildings, so as in the most wonderful manner to save materials and afford greater strength and security than could be obtained from solid beams, while we can save the expense and weight of solidity; we know how to build vaults nearly as well as did the architects of the middle ages; we have more experience than our forefathers in the chemical properties of materials and in their actual duration; we know more of geometry and calculation than they; and our abundance of capital and our navigation and roads enable us to procure from any distance the rarest materials at prices which compared with those paid by our ancestors are really very low; while in the workmanship of all but carving, which requires the slow operation of the human hand and the distinct operations of the human mind, our machinery can be made to perform that in a minute which took our ancestors a whole day to execute.

Of the improvements in the operative machinery which may be adopted in building.

Our forefathers performed with excellence almost every thing which they undertook; but it was by constant laborious and painful exertion. The triumphs of modern mechanical science have now rendered unnecessary, in a great measure, that painful bodily exertion: we have *now* mechanical powers which render the quarrying of huge and magnificent masses of stone an easy

labor; the steam-engine can be applied to effect the most extraordinary feats of exertion; we have powers which have raised an enormous ship; and we have the advantages of such roads, canals, and seaward navigation as no country at any former period ever possessed.

Of the excellence of the materials which the English architect may have in modern times at his disposal.

Since the improvements in railways and navigation we may have at our easy disposal, and at a cheap price, the magnificent produce of the quarries of granite; we have an abundant supply from the Isle of Portland of the most compact, white, hard, beautiful, and durable free stone that perhaps earth can produce; and, besides inexhaustible stores of iron and lead, we have such an improvement in the making and burning of bricks that they are sometimes, and always may be, more durable than those of any former period, and even more durable than most kinds of stone; we have inexhaustible stores of stone-lime, which in two or three years become scarcely penetrable; our ports may be inundated, as it were, with durable fir of the most splendid growth; and from the great way which English capital will go, when expended in other and poorer countries, we can procure cheaply all the beautiful and rare materials produced by foreign nations; and from the constant vast influx of the precious metals from the mines of Australia and America, money, compared with labor and general produce, has become cheap, not those articles become dear, for they are *comparatively* cheaper than ever; we can *now* buy for our edifices, lead, iron, copper, brass, bronze, silver, and gilding at real intrinsic prices which would have astonished our forefathers.

Of the question "Have we improved in our PRACTICAL *building?"*

With all our advantages have we improved in our practical building? The short answer is, No. Under the fostering influence of our Royal Academy, painting and sculpture have made rapid strides; the benevolent art of engraving brings home to every man's house, stores of knowledge and beauty which were formerly unpurchaseable.

Mechanical power and mechanical knowledge have advanced in thirty years more than they advanced in three thousand years before; we know how to build, in most cases, with as much skill as our forefathers, and in some with an infinite deal more skill; we can procure and raise such excellent materials as our ancestors hardly ever could; our money will go further in purchasing magnificent foreign materials for the adornment of our edifices; we

can cover them with gilding with as much ease as they could cover them with paint; for every cramp of iron which they put we can put one of bronze, and even almost of silver; capital can be found at an hour's notice sufficient to finish a building, the funds for which could not formerly be collected under a hundred years; and yet, with heart-breaking shame, almost every modern English architect is obliged to admit, that he rarely does anything of which he may be proud; from the use of mean and rapidly decaying materials, from marred design and from false appearances.

Of the bad modern national policy of discouraging public works and useful arts.

At a time when English territory was contracted and poor, at a time when much of English money was expended both in domestic as well as foreign war, at a time when papal demands drew off its gold to Italy, at a time when its population was scanty and its lands were ill-cultivated, every part of its extent was at once being gemmed over with the most beautiful churches, cathedrals, monasteries, halls, castles, colleges, and other beautiful public as well as private works. This enormous accumulation of excellence, which, after the havock that time and human fury have exercised against it, still forms, next to the works and gifts of nature, its proudest merit; this accumulation of wise science and beauty employed the children of the soil, but left no national debt; no debt, other than the debt of gratitude and esteem, has been left to the nation by those who built the cathedrals of Salisbury, Wells, London, and of our other cities.

But now that England is mighty all over the earth; now that by her political influence and her powerful domestic machinery she is almost ruining and under-selling all the world, and would quite ruin many of her neighbours were it not for the counterpoise of her national debt; while gold flows into her coffers from all nations and she has become the usurer of the world,—now is her land fallen to meanness; the costly beauties of her soil are the crumbling wrecks of former times; and with little exception beyond the mere means of access—roads, bridges, canals—all is poverty-struck and expiring.

Surely in this there is great national mistake. The employment of a population, *eager for employment*, does not impoverish a land, it enriches it: the growth of nature is but an ordained and necessary re-combination of nature's atoms; but the work of the laborer is a new creation; to draw from the quarry a block of stone, and to chisel it into beauty wastes not one grain of gold, but circulates it: were our half-employed population, who must live, and who do live, employed to their full powers in beautifying the land with useful and tasteful works, nothing that we now

possess (except idleness) would be lost; while the beautiful aggregate result of labor would be wholly gained: nay, there can be little doubt, that were our poor-rates paid to our destitute poor and to their fathers, sons, brothers and other relations for the performance of useful public works a more independent, a more moral and a better substitute, would be found for cherishing the destitute and unfortunate; and by the beautifying of the land the rich foreigner would, to our profit, come from afar to view its wonders; the money paid every year to the idle able-bodied poor would every year produce, under skilful guidance, one or two such national buildings as Wells Cathedral, which is more like the work of enchantment than human labor: the money paid every year to the idle poor of a large parish, is sufficient to rebuild the parish church, and might so rebuild it, and keep most of the paupers from destitution, if paid to them and their relations for labor performed: how wise is the old principle that the overseer *shall* find employment for the poor; such employment would, in fifteen years, entirely rebuild of granite and Portland stone, all those cathedrals which have been three hundred years decaying; and all our decayed public buildings would be rebuilt in a superb and durable manner, in an incredibly short time. Many parishes could, without extra charge, keep three or four hundred laborers constantly employed on public works. Hence the money laid out in public railroads is all gain to the nation without one penny loss; for no money is annihilated; but iron and stone are dug up, ground is removed, clay is moulded into bricks, while no gold and silver are lost, destroyed or hoarded up; and perhaps it is not going too far to believe that the surplus idleness of this country, properly awakened to activity, might by means of rail-roads and other improved communications cover over with fruitful soil and bring into culture most of the present barren tracts.

Of some laws which tend to the still further depression of English practical architecture.

While the general principle of the British laws is wisdom, soundness, and equality, it seems strange that among the other causes which have, in the nineteenth century, conspired to ruin our practical architecture are some singularly foolish laws, the repeal of which it is to be trusted will ere long be the forerunner of a revival of practical excellence in building.

Formerly we had a plentiful store of English oak for all purposes of domestic carpentry; much of this still remains in our ancient buildings and it seems rather seasoned than impaired by time: our glorious ship-building has now rendered the employment of fine timber of this description and of ample growth, rather rare with us; still, we obtain from the Baltic, on very

cheap terms, noble fir timber inferior only to oak, and for its squareness, length, straightness of grain, stiffness and kindly nature even superior to it. The author will yield to no man in love for his country, its church, its constitution, and its other institutions, yet he must confess that he thinks it hard, that timber fit for little else but fire-wood, should be brought here; while the magnificent, excellent and faultless timber from the Baltic should be too seldom employed.

This folly fills every peer's and every commoner's dwelling, with the dry-rot; it disparages every man's freehold; it injures every leaseholder; it every moment adds one more popular jeer to the outcry against the modern building-art; and it every day adds strength to the praise of "*the good old buildings.*"

It is not the author's intention to join in the too common outcry against the Metropolitan Building Act, which indeed needs some revision, partly from practical errors discovered in it, but which, though it be an act of a somewhat stern and interfering nature, has perhaps saved more lives and property than almost any other legislative enactment whatsoever. *

Of defects in buildings resulting from professors of architecture practising before they have acquired sufficient knowledge.

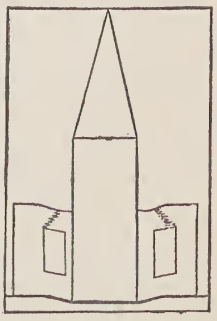
Taken from school at an age in which he cannot have imbibed in any degree sufficient of a polite and liberal education, the architectural pupil, frequently with no knowledge whatever of geometry, never acquires any beyond the mere manual dexterity of drawing circular and plain lines; abandoned by his master while yet scarcely arrived at manhood, forced into premature and profitless practice with all the expenses of a separate establishment, it cannot be wondered at that the adolescent architect sometimes has, in after-life, bitter cause to repent the circumstances and the rashness which led him to acquire practical design and practical construction, solely by his youthful failures; for it is then with deep repentance that he perceives the confusion of styles into which he has fallen; in many a breaking-up and fracture he has the mortification to find that inventions upon which he has relied for eternal duration have not survived their inventor's ruin; that he has formed his pinnacles with graduated outlines as if Rosslyn chapel or some other impure source were his only pursuit; he regrets that he has placed his columns opposite apertures, instead of opposite piers, he regrets that from false bearing, want of plumb

* This was written before the repeal of the timber duties and the late revision of the Metropolitan Building Act.—Ed.

and equipoise, his work is so fractured that even a man of more experience than himself cannot restore it; he perceives too late that his patronage of mean and fragile stone and pretended substitutes for it, his reliance on bad timber, has added something to the wreck of his country's architecture; he perceives with deep mortification that his want of mathematical and mechanical skill, both theoretical and practical, has led him to perform that which a professor of more experience would avoid; broken arches, tie-less roofs, walls thrust from their right position, partitions falsely trussed and groaning beneath loads which, formed otherwise they might have borne unflinchingly, and a foundation which fails in all directions from want of sufficient spread to the footings or from the building being carried up piecemeal, or from other causes—these are a few of the faults and disasters, which, in after times, make a precocious practitioner wish he had studied five or ten years more before he had risked himself and his employer's property.

Of foundations.

The foundation of a building, should be of such a nature, that it will bear without compression or flinching the weight laid upon it.



If the soil under a building, be of a soft nature, it will of necessity yield or compress beneath the weight placed upon it; if the building be uniform, and be well compacted and tied together, this compression may not lead to very serious consequences; but if any part of the building be loftier and more weighty than the other portions of it, as in the case of a church-tower or steeple, the soil beneath the extra weight will be more compressed than the other parts of the site; hence all that portion of the building will be sunk something into the ground; and in thus descending the masonry or brickwork will break away from the adjoining work, which remains more at its original level: this is the case at the churches of St. James, Clerkenwell, St. Leonard, Shoreditch, St. Martin in the Fields, and in many other instances.

In proportion as the soil is of a softer and more yielding nature, the footings of a building should spread the more; for if a square yard of ground will bear a ton weight with a certain degree of compression, two separate square yards will bear two tons weight with the same degree of compression, or they will bear one ton weight with only half the degree of compression, and perhaps less: on this principle, though a man in common shoes

will sink by his weight into snow, yet with shoes with extended soles, which will meet with the resistance of a larger extent of snow, he can walk freely over the surface of it without sinking; and indeed upon a rolling soil, such as sand, a foundation of two united yards superficial will bear more than two separate yards superficial,—for the soil can less readily roll away from the centre of a large plot than from the centre of a small plot; for in the former instance it has further to move before it can escape and fly up at the edges.

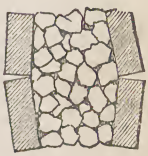
Gravel, next to unflinching solid rock, is the best foundation; for it does not flow and diminish in quantity, from water running through it.

The next best foundation is strong clay, in a confined situation; preserved from the heat of the sun, it is very certain; but in open country situations, during drought, it is apt to split, and cause fracture to buildings, unless their foundations be laid below the range of the fissures which occur in it. St. Paul's Cathedral, one of the very loftiest and weightiest buildings in the world, stands upon a layer of clay, only from four to six feet thick, above a quick-sand forty feet deep; yet, from the breadth and compactness of its footing, the goodness of its masonry, the equipoise of its several parts, and the masterly skill with which it is put together, it is freer from flaws and settlements than all other great buildings in the world, however good their foundations.

Of Masonry.

Of good square masonry, nothing need be said: no architect or mason is so ignorant as not really to know what good masonry is; it will therefore be better rather to mention the nature of bad masonry that it may be avoided by the architect, careful of his reputation, and jealously desirous that not one farthing of his employer's property may be foolishly dissipated.

That masonry is bad which being neither laid in courses so as to have only a downward pressure, nor bound properly together by the mere gravity of its materials, rolls apart, rends, and will not remain in a state of rest.



That masonry is bad which bursts open from internal rubble-work forcing out the external faces of the wall.

That masonry is bad which by the friable nature of its materials splits under its mere weight.

That masonry is bad which, however carefully and artificially constructed, soon decomposes by the mere operation of wet, frost, air and time.

That masonry is bad, the materials of which, however good, fall to ruin by the faulty manner in which they are put together.

Of cramps and plugs in masonry.

Of all the practical grievances under which modern masonry labours none is more dreadful than the absurd manner in which cramps and plugs are used for the purpose of connecting it together, but really to destroy it.

A building composed of good and honourable masonry, in ordinary situations, may be said to need no cramps; nearly equipoised and in a state of rest, scientific masonry falls together almost as certainly as the particles of the earth fall to one common centre.

If masonry be not equipoised to a state of almost perfect rest it is in vain that it be cramped together; neither cramps, nor girths, nor the cohesive strength of the stone itself will preserve it from irregular settlement and consequent fracture.

Where some other force, beyond that of mere gravity, is exercised against the masonry, as that of the waves of the ocean, or the current of a river, or where the masses of stone are light and may be easily removed by the hand of man, or by accident, cramps are necessary.

Cramps should never be of iron: the Author has never used one single cramp of iron, and he never will; he could produce such a catalogue of disasters and architectural destructions, merely from the corrosion of iron cramps, as would astonish any one previously uninformed upon the subject.

If cramps be used at all they should be of some material which will not corrode; for iron, particularly wrought-iron, unless buried a great way in the masonry soon becomes so bossed round with rust, as to split in pieces the strongest masonry.

A large stone building, with its masonry cramped with wrought-iron, has really thousands of wedges silently, but powerfully and unrestrainedly, operating its destruction.

The following observations relative to cramps, are taken from Wren's "PARENTALIA." Page 286. "*This has been observ'd, in "taking out Cramps from Stone-work at least four hundred "years old, which were so bedded in Mortar that all Air was "perfectly excluded, the Iron appear'd as fresh as from the "Forge.* THEREFORE IN CRAMPING OF STONES, NO IRON SHOULD "LYE WITHIN NINE INCHES OF AIR, *if possible; for the Air is the "Menstruum that consumes all Materials whatever. When "there is a Necessity to use Iron for want of Stones large "enough, Care is to be taken to exclude sufficiently the Air from "it.*" And even Wren's caution in this matter, does not appear to have been sufficient in every instance; or else the great number

of his architectural works in hand at once did not permit him to see with his own eyes that his intentions were fulfilled; for there is very little decay or injury come to his buildings, except that which has occurred by the corrosion of iron.

The following observations are from James Murphy's work upon the church of Batalha, in Portugal. "*The spire of* "*Salisbury, for instance, is but seven inches thick; and that* "*of Batalha is about the same thickness, independent of the* "*embossed work, though almost a fourth part of its superfices* "*is perforated. Great care must consequently have been taken* "*in selecting the materials employed in constructing such light* "*spires,* ESPECIALLY AS THEY ARE, I BELIEVE, IN GENERAL, CON- "NECTED WITHOUT THE AID OF IRON CRAMPS; FOR THIS METAL, "WHEN EXPOSED TO AIR OR MOISTURE, IS SUBJECT TO CONTRACT "RUST, WHICH IN TIME WILL SHIVER IN PIECES AS MUCH OF THE "BLOCK AS IT COMES IN CONTACT WITH. *Cramps of copper were* "*also used by the ancients in their buildings, which, according* "*to the account of Father Montfaucon, were tempered to an* "*extraordinary hardness.*"

Mr. Smeaton in his invaluable account of the construction of the Eddystone lighthouse (section 158), gives the following account relative to a stone steeple which was partly destroyed by lightning, January 25th, 1757. "The steeple of the church of Lostwithiel "before this accident was 113 feet high, whereof the lower part "was a square tower of 49 feet, finished above with an elegant "Gothic octagon lantern, 12 feet high, and above it a stone spire "of 52 feet, of which a portion of 20 feet of the upper part was "entirely burst, and dispersed in all directions; and some of the "stones that composed it were found at the distance of 200 yards.— "The masonry, as is usual in ancient and well-built spires, was "very light, *the stones composing the shell of it being no more* "*than seven inches thick; so that the single stones of it could* "*not in general exceed one hundred weight: yet as they were all* "*curiously joined together at the ends,* MORTOISE *and* TENON "*fashion*, and appeared to have been exceedingly well cemented "together, nothing, as it should seem, but a great power of some "elastic vapour, similar to the sudden explosion of a considerable "quantity of gunpowder, could have burst and dispersed the "materials of the spire in the manner it had done: for besides "the part entirely destroyed, to six feet further down, one half of "the shell was thrown down, and the other half left standing, in "so perilous a state, that it was judged necessary to take it down; "and in doing this, the work was found so disjointed and shattered "that it was thought necessary to take down six feet more. It "was in this situation when I viewed it, the beginning of March; "and I found that the whole of the spire left standing, as well as "the lantern, was greatly cracked and damaged. Many other "circumstances occurred which showed the effects of an elastic

" vapour, that wanted to get at liberty by expansion, somewhat " similar in its most obvious effects to that of gunpowder; and " under this idea, I might have been tempted to suppose, that had " the shell or spire been rendered stronger by cramping the stones " together, as well as *tenoning* the ends, it might have sustained " the elastic pressure outwards, without being torn to pieces: but " there were some attending circumstances which convinced me, " that the action had not been altogether in the way of an included " elastic vapour, endeavouring to expand itself; upon which prin- " ciple, the *weakest parts* would have given way, and have afforded " an opening to the vapour: for, at the bottom of the steeple, at " the level of the ground, an hole had been pierced entirely " through the wall, and through an opposite buttress, whose " compound thickness amounted to eight feet."

To the opinions of other eminent men, may be subjoined that of the justly celebrated Leon Batista Alberti, who, in the 11th chapter of the third book of his Architecture, says, " *Cramps and* " *pins of iron are not reckoned amiss; but I have observed in* " *the works of the ancients, that iron rusts, and will not last;* " *but brass will almost last for ever. Besides, I find that marble* " *is tainted by the rust of iron, and breaks all round it.*" " The " cramps must be so placed that no drops of rain may penetrate " to them; and it is thought that the brass ones* are yet more " strengthened against old age, if in casting they are mixed with " one thirtieth part of tin."—*Leoni's Translation.*

There no longer remains any excuse for using any but cramps of copper, bronze, or gun-metal. From the vast increase in the world of the stock of the precious and other metals the incomes of workmen and of their employers are now apparently so great that whereas in the reign of King Edward the Third *a single pound of iron* cost nearly the diurnal wages of a labourer, now *a pound of copper* does not cost above one-third of the daily wages of such a labourer: and moreover, even in the reign of Edward the Second, although ties of metal which would not corrode might have been deemed too expensive, yet it appears that at the palace of Westminster *iron ties with tinned heads* were made use of.

Thus it may be concluded, that at the present day, with the present experience, and at the present prices, no one can use iron cramps in masonry without justly incurring the charge of ignorance or of self-willed obstinacy. The author has not himself been without chagrin upon some occasions when, after he has elaborated a specification, with directions, the soundness and

* *Brass*, would here be probably translated better by *copper*. That ordinary brass does not stand in the weather so well as copper may be seen even in so small an article as the Thermometer, the bridles and screws of which last long if made of copper, but which quickly decay if made of brass. A portion of tin mixed with cramps of copper renders them both harder and more durable.

economy of which observation upon the defects of existing structures has fully proved to him, to find that from some uncontrollable circumstances his work has fallen into the hands of some vain, ignorant, or unprincipled man, who, besides the other intermeddlings of destructive folly, has exchanged his instructions for the use of copper or gun-metal in connexion with stone, into orders for the use of corrosive iron, and has thus set wedges for the cleavage of that building which had perhaps till then escaped the violence of time and the artillery of civil-war.

The considerate *practical* reader will recognise with a smile, with esteem, with confidence, and with delight, the prudent observations upon this subject of the honest, inventive, and in his time the courtly De L'orme.

"Soubz ombre du fer et du plastre, ilz ont esperance "Inconue-
" que leur ouurage tiendra trop. I'ay ueu aduenir un "niens qui
" autre grand mal aux bastimẽts pour mettre du fer dans "aduiennent
" les maçonneries et auec les pierres de taille: car le fer "pour mettre
" s'enrouille, et s'enrouillant il s'enfle et faict rompre les "du fer à la
" pierres et murs qui ne peuuent durer longuement. De "maçonne-
" ce nous prendrons par exemple, le Liarre, duquel les "rie."
" racines liees et prinses dans les murs attirent et rongent
" la substance du mortier, et comme elles deuiennent
" grosses, se font faire place, recullant les pierres qui
" n'ont plus de mortier, et par ainsi les rendent prestes
" de tomber. Quoi, uoyant aucuns en ont faict cest
" diuise, *Inimica amicitia*, qui est à dire, ennemie
" amitié: ou, ce qui m'aime me ruine. Ainsi est-il du "Nature du
" fer, lequel les meschantes maçonneries aiment de peur "fer auec les
" qu' elles ne tombent, mais à la fin il les ronge et ruine. "maçone-
" Faisant tout ainsi que ledict liarre, lequel apres auoir "ries."
" acheué de ruiner la muraille, et l'auoir mise par terre,
" n'ayant aucune chose pour se soustenir, est contrainct
" de tomber sur le chemin. Auquel, apres auoir marché
" dessus, est couppé, pour les empeschemens qu'il peult
" faire: et par ainsi il meurt comme il a faict mourir le
" mur. Chose semblable aduient à aucuns hommes, qui
" soubz ombre d' amitié, appuis ou alliances auecques
" autres, ilz en tirent leur substance, et les font mourir
" d'ennuits et pauureté, pensants y gaigner beaucoup: "Faulte q
" mais apres auoir succé et attiré d'eux iusques au sang, "fot les ma-
" ilz trebuchent et sont mis à neant par le uouloir et "gons usans
" iustice de Dieu, qui ne ueult le mal demeurer impuny. "de fer aux
" Philibert de L'orme. Novvelles Inventions "bastiments."
" povr Bien Bastir." Paris, A.D. 1561, cap. iv. folio 6

On the use of iron in stone and brickwork.

In general the architect must fear to attach any iron-work whatsoever to stone-work, or even to let it touch it; but he need not take the same pains with regard to attaching iron to brick-work: buried in brickwork, very little if any change in it takes place; nor does it appear that brickwork is injured by it: but he should take care, that no iron-work, particularly if wrought, should at its issue from brickwork cause rust-stains to the facing-work, more especially if of white bricks.

The wrought-iron discharging cradle-bars, which the author has placed over stone window-heads, he has had soldered up completely in a sheathing of milled-lead to prevent corrosion, or the imparting any stain to the stone-work; and where he has placed such cradle-bars he has afterwards neither observed rust nor breach of the stone heads: but even the slightest settlement or yielding of those bars would have broken the stone-work beneath them if there had not been an arched hollow space left between the iron and the stone; which space, after the building had settled, was merely concealed by an extremely thin face-work, set in a great deal of very soft mortar, on purpose to yield in case any further settlement should occur.

Perhaps if the cradle-bars were heated, and pitched all over they would need no other preservation from rust; and common red sealing-wax, applied to hot iron, appears to form a perfect anti-corrosion varnish, which neither cold nor great heat will destroy.

The author has had the ends of wrought-iron railings filed smooth and tinned over, when inserted in stone-work; but this is very expensive if applied on a large scale.

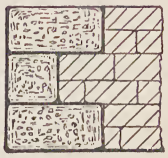
How injudicious is the exposure of iron in situations where its corrosion and destruction may lead to serious consequences was to be seen in the steeple of Saint Mary-le-bow, London, where there was a wrought-iron chain-bar running through the shafts of the Peristylium; this chain-bar was, in a great measure, destroyed by rust; and two of the columns split by it, through the body of the stone, and only held together by girths of iron: this defect, in the end, led to a very expensive further repair and restoration of the steeple.

The author had, some time since, to survey a steeple and to make a specification for the repair of it; this steeple had two exposed chain-bars of wrought-iron running through the eight piers supporting the spire of it; these were found considerably rusted: he therefore deemed it requisite that means should be taken, to prevent their further injury, especially as the foundation of the steeple was defective, was ill-drained, and had been badly dealt with; the means proposed were to file them clean, to heat and pitch them over, and to encase them in sheet copper.

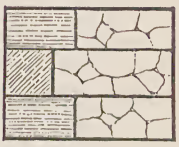
Of the cheapness of granite for the facing of ordinary buildings.

Mean in its buildings, but truly sumptuous in its pavings, London is a surprise to most strangers.

Paving of undressed, but square granite, nine inches deep, is provided and laid down at about one shilling per foot superficial: now allowing for the extra price which is paid for the facings of brickwork, and deducting an average of nine inches from the thickness of the brickwork, it appears that the plain parts between the decorations of churches and other public buildings may be faced with regular courses of granite, unpolished it is true, but almost everlasting, and better wrought and smoother than the rubble-work of most Gothic churches, and that at the same price as our present mean brickwork; but if instead of with courses of square granite we were to face our walls in the ancient manner, with the "*Opus incertum*," small irregular granite could be brought to us as ballast, at a price cheaper than that of any kind of stone which we at present use; and in villas and many other buildings, it might, by judicious use, be made to appear very picturesque by forming it in courses thus, with quoins of squared granite, or of other stone: and granite curb eight inches thick, and squared all round, costs only two shillings per foot superficial. Indeed, walls may be built in London of superb masonry, twelve inches thick, wholly composed of solid blocks of squared granite curb, of excellent bond, being in blocks five or six feet long, at three shillings per foot superficial; while walls one brick and a half thick, faced with yellow bricks, cost fifteen pence or more per foot superficial.



Section of brickwork faced externally with rough blocks of granite in courses 6 inches high, and alternately 12 inches thick and 6 inches thick, so as to form an average thickness of 9 inches.



Elevation of a kind of granite "*Opus incertum*" masonry, ranging in courses with quoins of squared stone.

The granite may be brought from Scotland or Cornwall, of the exact required size, without the enhanced expense of the high-priced labour of the metropolis.

Of the injury which has fallen upon English architecture, from the extensive use of Bath stone; and of the difference between good stone and bad stone.

Perhaps one of the most fatal events for modern metropolitan architecture, and for that of a considerable portion of the remainder of England, is the repute into which, in modern times,

Bath stone has come: of all building free-stones it is, if not properly selected, perhaps the worst; it is naturally of so ill a color, is of so seamy and coarse a texture, is so porous, and so readily becomes still darker and more disagreeable in color, is so soft and of so fragile and rapidly-decaying a nature, that however little it may cost to work it, that little may be justly considered to be thrown away: of the churches which have been built within less than the last thirty years, wherever this material has been made use of, hardly one exists in which more or less dilapidation in the stone-work has not already taken place: the restorations of Henry the Seventh's Chapel at Westminster, soon after they had been finished, of the very choicest and of the most carefully selected specimens of this perishable and grim material, were, it is to be deplored, already crumbling away, while the original sub-plinths of the building, being of a harder material, have after 300 years suffered little from the tooth of time. The columns, bases, plinths, cornices, balustrades, and other work of Bath stone, with which the Regent Street and the new buildings of the Regent's Park, London, have been pretended to be decorated, have in numerous instances arrived at a frightful degree of decomposition; indeed parts of the columns of the park-lodges, near the Regent's Circus, have been replaced; the columns of All Souls' Church, Langham Place, are fretting away, the stone casing of the tower of the same church is flawed in many places, and the tower is altogether in a deplorable condition. If any one be really unacquainted with the ungenerous nature of the competition between the brilliant and admirable quarries of Portland roe-stone, and the doleful ones of Bath, let him compare the superb masonry of the water-front of Somerset House, built about seventy years since, with that of the building at the opposite corner of Waterloo Bridge, built about twenty-five years since, and which is chosen specimen of its kind.

Of the extra caution required in building edifices with square stone.

So guarded must an architect be in the erection of edifices of large square stone, the various blocks of which are accurately fitted together so that one stone cannot alter its position without disarranging many, that all his attention is called into the most active play to guard against every irregular settlement and subsidence; for the materials not being flexible, but friable, must certainly break and rend in coming to a state of repose, which the enormous weight of materials in even a very small building cannot effect without great strain and powerful effort: even the stone window-sills of a prison, one or two feet thick, and though they scarcely enter the piers at the sides of them, from being pinned in

tightly, often crack in the middle; and not unfrequently, a small piece is rent perpendicularly from off each of their ends.

Much of the firmest ancient masonry consists of very small blocks of stone, set with rather coarse joints in a considerable quantity of mortar, which the stone has well imbibed: of this description of work, were formed many of the ancient Gothic vaultings:—and to this day, upon digging almost anywhere into the ground in the neighbourhood of the destroyed Priory of the Knights Hospitallers, at Clerkenwell, voussoirs of the arch-ribs of that building are constantly disinterred: these are in general not more than 5 inches long, are in perfect preservation, and though wrought with very great precision are not arched, their shortness enabling them to be set to the proper curvature with apparent exactness; while the frequent recurrence of the mortar-joints between them, has preserved them from fracture by settlement.

In building with squared stone, too much care cannot be taken to prevent the different courses of the masonry from touching each other externally; for if this precaution be not taken the external face of the stone-work will certainly be splintered off: where the stones are heavy, as in the case of columns, damage of this description is most effectually prevented by the interposition of plates of lead in the horizontal joints, leaving the joints open half an inch back, or more, and pointing them up only when the work has found its full state of rest.

Of the quantity of material requisite in a building.

Much ignorance exists in modern times in the great quantity of material requisite to be employed in rendering a building successful; *wisdom in putting it together* does more than the *quantity* of material.

A Gothic architect has built a vault only a few inches thick, which has lasted five or six hundred years unimpaired, and has saved purse, walls, piers, and foundation, alike from a heavy burthen: but a modern vault of immense thickness, has either fractured instantly, or has thrust out the walls, sunk the foundation, and led to a rebuilding of the whole structure.

Five hundred years ago the stone spire of Salisbury Cathedral was carried up to a height which few human works have ever attained, and has ever since resisted storm, tempest, and lightning; and if violence be not used against it, may last as long as the pyramids, though compared with them it is almost as light as a feather; but the more cumbrous dome of Saint Peter's, at Rome, has, from its want of sound construction, split desperately in five hundred places, from its crown to the foot of its supporting peristylium; and many modern small steeples from that and other

causes have required to be rebuilt in less than a hundred years from their first construction.

The exercise of wisdom empowered the carrying up of the proud spires of Fribourg, Vienna, Strasburg, Antwerp, Salisbury, and Norwich; the decay of constructive wisdom, compelled the intended western campaniles of Saint Peter's to remain unbuilt, the foundation of the church to be relieved from their rising burthen and the façade of the building to remain to this day the largest but meanest on earth.

Of the prevalent perverse spirit by which materials the least proper for the duration of architecture are employed in the various parts of many edifices.

Another gradation in the decline of practical architecture, ensues from the bad adaptation and choice of materials.

The worst property of iron beams or girders is their uncertain nature; frequently, though they will bear considerable weight in an inert condition, the least addition to that weight or the least tremor given to them will break their substance and cause perhaps, besides destruction of property, loss of life or limb. The only legitimate and scientific use of iron in buildings is the subjection of it to *compression:* nearly all the instances of its use in modern architecture where it is subjected to the cross-strain of its own gravity and to that of a heavy additional load, savor strongly of a decline of art and skill.

In ground-floors in contact with damp, cast-iron beams laid upon wall-plates of stone or iron, are well applied; for a floor so constructed will last long; but by fatal perverseness, this useful application of cast-iron is rarely made; the author, wherever he has so applied iron, has found the most successful result.

Iron breast-summers will not easily decay by rot; but under fire they are far less certain than even those of wood. The author has surveyed many houses after conflagration but he never remembers to have seen even one wooden breast-summer wholly destroyed,—for being near the bottom of a fabric and too thick to ignite entirely they are hardly ever consumed through.

All the architectural works of the olden times, which exhibit such structural excellence, do all awaken the most delightful sensations in the poet the antiquary, the philosopher, the layman, and the churchman, the civilian and the warrior, the prince and the peasant:—Structural excellence and poetry, go hand in hand, alike with the works of the Egyptians, the Greeks, the Hindoos, the Romans, the Arabs, the Moors, and the early Christians. But now instead of so forming our architecture we disdain structural excellence; the only endeavour is to copy at second-hand some ancient work in bad and improper materials,

and strike alone (and that even but very rarely) at pictorial effect; yet we wholly fail; the proof of this is that the soul of the modern painter which delights in embodying in his charming works all kinds of ancient architecture, will not copy one particle of our modern architecture; nor will we ourselves copy from it. This proves incontestably that art and science in architecture have fallen; were it otherwise, our porcelain our plate, our furniture, every thing around us, would bear the strong family impress of our architecture as such things have in all times past and in all nations.

Of the injury resulting to architecture from the improper state in which timber is generally used.

Added to the other defects of modern English building, particularly that of the metropolis and its immediate neighbourhood, is the improper state in which timber is used.

The major part of our best timber is imported from the north of Europe *and is immersed in docks* and lies their floating till it is sold for immediate use; the consequence of this is, that the timber, (though even it may be previously properly seasoned) becomes swelled to much beyond its former and its ultimate bulk, is hastily framed together, and very soon after it is so converted it shrinks to such a degree, that every tenon becomes loose, every joint strains falsely from the shrinkage, and every ceiling and quartered partition cracks by the opening diminishing and distortion of the wood.

If to immerse timber in water seasons it, it does not render it fit for use, but in fact, the very reverse of it. Timber for ordinary purposes should be shrunken to its smallest limits before it is worked up; the least possible change should occur in the timber after the work is framed and adapted; for all the oblique joints of it, by shrinkage, become imperfect, each bearing-timber then hangs straining upon a single point instead of upon a flat direct abutment; thence many of the struts and other bearing-timbers rend by the weight hanging merely upon their angles.

In very many cases dry-rot is engendered in our hastily-constructed buildings by the quantity of dock-water pent up in the timber, by its mortices and other joints, by the plastering, by the brick-work, and by many other causes. While our timber is at the saw-pit the water streams from it; and though it may appear choice and close when first selected and wrought, the sun and air in a very few days suffice to render it coarse, open, full of cracks, and wholly unfit for good work. (Plate I.)

Our specifications are very strict in the requirement of the perfection and proper seasoning of timber; but these precautions are almost useless: the builder can hardly procure at any price

timber which is not in a dropsical condition; and twelve months, in general, suffice to diminish in bulk, and to split our carpentry, alike whether it be framed for the palace or the cottage, for the public or the individual.

On the carelessness of not banishing from public buildings all combustible materials, and of the disasters emanating from this vice.

It does not appear whose fault it is, yet hardly can it be deemed anything short of a crime against the nation, that the most truly valuable collection of riches in the world,—the statuary, the curiosities, the records, the books, the royal library, the immense wealth of the British Museum, the liberal gifts of the public, the munificence of kings, the liberal and princely gifts of high-souled true patriots,—this wonderful, this admired, this unpurchaseable store, of art, taste, wisdom, learning, of heavenly and of human mind, should be placed in a new building where the consuming floor, the blazing roof-beam, the ignited wainscot, may destroy in a few hours the relics of four thousand years, or more, invaluable manuscripts, the Magna Charta, and the innumerable other things, which neither industry, wealth, nor time, can replace. How many centuries did the timber-work of York Minster escape, and was yet at last consumed, and with its destruction entailed that of much of the precious sculptures in stone, which till lately enriched that sacred and august fabric?

A public building ought to be built without joists, girders, floorings, or ceilings; an incombustible roof may be difficult to construct well; but the case demands imperiously that it should be so constructed; the building should contain no skirtings, wainscottings, or door-linings of wood; these should be of stucco, stone, or marble, or of some other incombustible material; scarcely should the doors and windows be of wood or have any material about them which can burn.

And, above all, as many of these fine stores of knowledge, industry, and history will themselves burn they ought to be so detached in small portions that any lamentable accident shall only destroy a comparatively small portion of them.

On this subject, Alberti, with his accustomed wisdom, speaks thus:—

"I am entirely for having the Roofs of Temples arched, as "well because it gives them the greater Dignity, as because it "makes them more durable. And, indeed I know not how it "happens that we shall hardly meet any one temple whatsoever "that has not fallen into the calamity of fire. .....*Cæsar* "owned that ALEXANDRIA ESCAPED BEING BURNT, WHEN HE HIM-"SELF TOOK IT, BECAUSE ITS ROOFS WERE VAULTED. Nor are

" vaulted roofs destitute of their Ornaments. The Ancients trans-
" ferred all the same Ornaments to their Cupolas, as the Gold-
" smiths used about the Pateras or Cups for the Sacrifices; and
" the same Sort of Work as was used in the Quilts of their Beds
" they imitated in their vaulted Roofs, whether plain or camerated.
" Thus we see them divided into four, eight, or more pannels, or
" crossed different Ways with equal Angles and with Circles, in
" the most beautiful Manner that can be imagined. And here it
" may be proper to observe, that the Ornaments of vaulted Roofs,
" which consist in the Forms of their Pannels or Excavations, are
" in many Places exceeding handsome, and particularly at the
" *Rotonda* at *Rome;* yet we have no where any Instruction left
" us in Writing how to make them. My Method of doing it,
" which is very easy and cheap, is as follows: I describe the
" Lineaments of the future Pannels or Excavations upon the
" Boards of the Scaffolding itself, whether they are to be Quad-
" rangular, Sexangular, or Octangular. Then those parts which
" I intend to excavate in my Roof, I raise to the stated Height
" with unbaked Bricks set in Clay instead of Mortar. Upon this
" Kind of Mount thus raised on the Back of the Scaffolding, I
" build my vaulted Roof of Brick and Mortar, taking great Care
" that the thinner Parts cohere firmly with the Thicker and
" Stronger. When the vault is compleated and settled, and the
" Scaffolding is taken away from under it, I clear the solid
" Building from those Mounts of Clay which I had raised at first;
" and thus the Shapes of my Excavations or Pannels are formed
" according to my original design."—Book vii. Chap xi.—*Leoni's* Translation.

Is it not enough, that most of our churches were burnt down several times within a very short period before our prudent ancestors adopted stone for the structure of the principal parts of them, and the use of which material has since saved most of them for centuries? Is it not enough, that in and near our own times, London and other cities have suffered so severely from conflagration,—that the Cotton manuscripts, now in the British Museum, should have once been partially destroyed,—that the Custom House of London was consumed,—that the British Parliament Houses suffered the same fate,—that the roof of the precious Abbey of Westminster has been on fire,—that the Cathedrals of Rouen and Chartres met the same fate,—that the like misfortune, some time since, occurred to the Marquis of Salisbury's celebrated house at Hatfield, in Hertfordshire,—that Warwick Castle has also in the same way suffered considerably,—and that the Royal Exchange, London, was destroyed? These form but an exceedingly small portion of the disasters which have, within a short period, occurred to buildings of consideration; but the accidents by fire, which have happened within memory to private buildings, no catalogue could enumerate; it is true, that in London, the excellent pro-

visions of the Building act, for the partial prevention of fire, have many times saved the metropolis from a fate similar to that of the year 1666, and do in most cases of burning confine the damage to one house; yet such is the strange perverseness of many of those who build, or such are the perverse circumstances under which they build, that they seem to consider this benevolent act as one which it is their duty to evade,—and the district-surveyors appointed to see its provisions fulfilled, as men whom it is their duty to out-wit.

Now, on the subject of rendering buildings fire-proof, the reader is referred, for ordinary buildings, to the *Transactions of the Institution of Civil Engineers of London*, in the xviiith Article of the 1st Volume of which is to be found a most interesting "*Description of the Method of Roofing in use in Southern Concan, in the East Indies, by Lieut. Francis Outram.*" For buildings for the purposes of store-houses, the reader is referred to the warehouses erected of brickwork, stone and iron, at Sheerness, Kent, and other places; and to the vaulted apartment under St. Stephen's Chapel, Westminster, which withstood, uninjured, the great fire which consumed the Houses of Parliament. And for buildings of a sacred character, the reader is referred to the stone roof of the Church of Batalha, in Portugal; Rosslyn Chapel in Scotland; to the Cathedral of Milan, relative to which see *Archæologia*, Vol. 16, p. 303, where the late ingenious accomplished and Rev. Mr. Kerrich states, "It is extremely singular that "there is no covering of tiles, or lead, or copper, or any roof of "timber, to this church: it is merely vaulted over, and upon the "vaulting are laid large slabs, or planes of marble, to carry off the "rain and moisture."

And again, the Reader is referred to the instances of the stone-roofed chapels of Ireland, some accounts of which will be found in the "*Antiquities of Ireland*," by Edward Ledwich, LL.B., A.D. 1790, and from which the following extracts are taken:—

"The Church of St. Doulach, situated about four miles to the "East of Dublin, on the road to Malahide, is a curious structure. "It is forty-eight feet long, by eighteen wide. There is a double "stone roof, the external which covers the building, and that "which divides the lower from the upper story." "You enter the "chapel. This is twenty-two feet by twelve, and lighted by three "windows, one at the East, and two at the South; the arches "pointed and decorations Gothic, these with the tower are later "additions. The roof is of stone and carried up like a wedge. "The stones which cover it are not large, but so well bedded in "mortar, that after many centuries this roof transmits neither "light nor water."—p. 144.

"There is a very ancient crypt in an isle in the Shannon, not "far from Killaloe, but that of the greatest magnitude and best "architecture is Cormac's Chapel at Cashel. This stands on an

" high insulated rocky hill. The inside length is forty-seven feet " eight inches; the breadth eighteen: the height of the roof from " the ground, on the outside, is fifty-two feet, and the slant of the " roof twenty-four. It has a chancel and nave. On square pillars, " adorned with a lozenge net-work, rest round columns as on their " pedestals, from which the springers of the arch arise. These " columns are short and thick, and have bases, tores, capitals and " entablatures, rudely executed: the portal is semicircular, with " nail-headed and chevron mouldings, and the windows are also " half circles."—p. 146. "The stone-roofed chapels before de- " scribed, and denominated from Cormac, I think, must have been " constructed posterior to the age of this prelate." "The dimen- " sions of this chapel are thus stated :—

	Ft.	In.
" Length of the nave	30	0
" Breadth	18	0
" Length of the choir	13	8
" Breadth	11	6
" Breadth of the grand arch leading to the choir	9	0
" Width of the north door	2	7
" Of the south door	3	4
" Of the west door	4	6
" Mean thickness of the walls	4	1
" Length of the square tower	10	0
" Breadth	6	8
" Height	68	0
" Height of the stone roof from the ground	52	0
" Slant of the roof	24	0
" Diameter of the columns of the grand arch	0	6
" Height	8	0
" Height of the entire arch	12	6
" Breadth of the archivolt	3	6
" Length of the chapel inside	47	8
" Length outside	53	0

" This is certainly one of the most curious fabrics in these " kingdoms. It is a regular church, divided into nave and choir, " the latter narrowing in breadth, and separated from the former " by a wide arch. Under the altar, tradition places the bones of " St. Cormac. There is a striking resemblance between this " Chapel and the Church of St. Peter, at Oxford ,with Grymbald's " crypt beneath it."—p. 150.

Moreover, the reader is referred to the instances of the incombustible brick dome over the Pantheon at Rome, which is perhaps the cheapest as well as the most durable and unconsumable roof which could have been erected over so great a building: other instances are the reputed tomb of Theodoric, at Ravenna; the Abbot's kitchen at Glastonbury; the ancient

curious brick dome of the temple of Jupiter in the Palace of Diocletian, at Spalatro, in Dalmatia; and above all the excellent instance of the reputed Temple of Vesta at Nismes, in Languedoc, the vaulting and external covering of which are of the lightest yet most durable description, and may be imitated in common brick-work and slate; this specimen may be applied successfully to the very largest class of modern churches, and while it affords the greatest possible internal sectional space, it possesses the further advantage of the inclination of its external covering being adaptable to the rake of a pediment:—and among modern instances may be mentioned the early instance of the celebrated cupola of the Church of Santa Maria del Fiore, at Florence, the work of Filipo Brunelleschi; that of the Vatican designed by Buonarotti, though very defective in structure; and that of the Church of Saint Geneviève at Paris: to these may be added many oriental domes; and in general, the Gothic cathedrals and great churches, in England and other countries, are indestructible by fire, except their roof-timbers; and the same may be said of the Cathedral of Saint Paul, London, which, except the carpentry over its various domes, is entirely fire-proof; and among the other structural excellencies of this sumptuous building, its several porticos possess the exceedingly rare merit, of having their soffits entirely formed of beautiful stone so as, in this particular, to throw into the shade all the porticos of Greece, the roofs of which were formed of the most expensive materials, yet were weak and perishable,—the marble coverings of them, from want of science, being frequently upborne merely by wood-work, which, if it escaped conflagration, soon decayed by the moisture which it imbibed.

And here it is but justice to Sir John Soane to praise the manner in which he constructed nearly all the apartments of the Bank of England, entirely fire-proof and without any carpentry whatever: in his arches and domes he made use largely of hollow pots or cones, of coarse earthenware, of the description shown in the accompanying Plate I., fig. 1: these, while possessing strength sufficient not to crush,—by their lightness relieve the walls in a great measure both from the lateral thrust and the perpendicular pressure, which result from the use of heavy solid materials: and indeed, it might be possible to form arches and vaults of equilibrium of these pots by leaving empty those of them placed at the summit of the work, and gradually filling them with cement or mortar of different densities, increasing towards the springing of the arch, and thus to prevent both crushing and drift to the haunches and lower part of the work.

The following instance of the use of hollow pots in the construction of vaults, cupolas and other parts of edifices, by the ancient Romans, are noticed by d'Agincourt in the 135th page of the first volume of his *Histoire de l'Art, par les monumens, depuis sa decadence au 4^e^ siecle jusqu'a son Renouvellement au 16^e^*.

" L'emploi des vases de terre, dans la construction des murs, " et sur-tout des voûtes, offre une singularite qui merite d'attirer " notre attention.

" On ne s'en servait point comme des vases d'airain dont parle " Vitruve, lib. v. cap. 5, dans l'intention de donner a la voix plus " d'eclat et au son des effets plus prolonges.

" Les vases de terre cuite, dont Vitruve parle aussi, avaient " uniquement pour objet d'alleger le poids des constructions dans " lesquelles on les employait, et de prolonger la duree des monu- " mens, en diminuant leur depense. C'est ce qu'on voit au cirque " de Caracalla, fig. 50.

" Le genre de service que la poterie pouvait rendre, comme " objet de maçonnerie, devait la faire principalement employer dans " la construction des niches et des voutes. Nous en avons vu la " preuve, a Rome et a Ravenne, dans des monumens rapportes " sur les planches xxii et xxiii. La figure 51, nous en " offre ici un exemple: c'est l'escalier par lequel on descend " de l'eglise de St. Sebastien, hors des murs de Rome, dans " l'oratiore souterrain dit de St. Damase, Ce monument est du " 4e. siecle.

" On retrouve encore la même construction dans deux fabriques " des environs de Rome, dont je ne puis indiquer la date, mais qui " sont certainement très anciennes. La première, fig. 49, est située " à peu de distance de la porte Majeure, sur l'antique voie *Præ-* " *nestina:* elle est entièrement en ruines. Des vases de terre, de " la forme de celui que j'ai figuré dans son entier, se voient encore " de distance en distance dans le massif des murs, et en les trouve " disposes sur deux rangs sur la cime d'une espece de calotte qui " recouvrait l'edifice. La seconde fabrique est situee à trois milles " à-peu-pres de la même porte, sur la voie *Labicana*, dans un lieu " qui s'appelait autrefois *Inter duas lauros.* Cette ruine, de " forme circulaire, offre une telle quantite de vases de terre cuite, " qu'on l'appelle encore aujourd'hui *Torre pignattara*, du mot " Italien *pignatta*, qui signifie un vase de terre. Ce surnom " populaire est loin de rappeler l'auguste et religieuse origine de " la fabrique qu'il designe: celle-ci faisait partie de l'eglise dans " laquelle Constantin avait place la magnifique urne qui contenait " le corps de sa mère Hélène.

" On a trouve, en Sicile, une porte antique, fig. 35 et 36, dont " les jambages sont en pierres de taille, et dont le ceintre est " forme par trois rangs de vases ou de tubes en terre cuite enfilés " les uns dans les autres. Les vases de terre trouvés à Metz, dans " un pavé de mosaïque, nous offrent une pratique beaucoup plus " extraordinaire, que le comte de Caylus a cherché à expliquer " dans le tome v, page 327, et Pl. cxviii, de son Recueil d'An- " tiquités."

In conclusion, if other instances were wanting to show in what manner even regal habitations may be rendered fire-proof,

may be instanced the Portuguese King's Palace of *Mafra*, a description of which may be seen in the work of Father John do Prado, published at Lisbon, A.D. 1751*; and of which also may be found in the 289th page of Murphy's *Travels in Portugal*, A.D. 1789–90, the following notices:—"The entire of this vast "pile is vaulted and covered over with flags, forming a platform, "whereby we may walk over the summit of the edifice;" but even this building it appears suffered from the effects of lightning and the want of proper conductors, which have since been erected in some parts of the building; for Murphy goes on to state that, "Here I observed several large blocks of stone that were shivered "by lightning. Conductors are erected in the different parts "wherein the injuries happened, but nowhere else."

On the inferiority which is often to be found in modern brickwork. (See Plate I.)

Soundness is nothing more than that the work should be composed of good materials correctly bonded in every part, should be thoroughly cemented together, and that as few broken bricks as possible should be used in the work.

An idea is prevalent that great care and exactness in the choice of the materials of Brickwork, and in the workmanship of it, are too burthensomely expensive to be borne in ordinary buildings; no idea could be more erroneous, for bad materials will not support much more than their own weight; and though bad Brickwork may even cost only £10 per rod, a much larger bulk of it is required for supporting the same weight, and for keeping out the weather equally well, than for the same purpose would be required of Brickwork of a better quality, while the carriage is as costly and the mortar and workmanship of it are as expensive and sometimes more so.

It will be found that for the performance of a certain quantity of good *malm paving-bricks* set in the best stone-lime mortar will (besides their superior duration) be cheaper than the worst descriptions of *place-bricks*. It is useless to plead, that of itself, circumstances apart, such a wall is too thick or too thin; for sufficiency of substance depends entirely upon the purpose for which work is required. If he who built Salisbury spire found out the art of so disposing the materials of it as to make a thickness of 7 inches of stone last 500 years and still to remain, it is in vain to say that a wall 9 inches thick will not serve for such or

* "Monumento Sacro da Fabrica, e Segraçao da Santa Basilica do Real Convento de Mafra. Joao do Prado. Lisboa, 1751." A copy of this work is in the Royal Library of the British Museum.

such a purpose: the masonry of Gothic edifices is but rarely in its particles so sound as excellent Brickwork.

When you deduct from Brickwork in ordinary buildings the loss of strength occasioned by badness of material, by disconnection of the bond, by small pieces being inserted where whole bricks should have been used, and by the weakness which is the result of the work not being duly cemented, you will find that the useful part of common work (if indeed it possesses any such) executed at £10 period really costs £50 or more per rod: and then when it is considered, in a vast number of our erections, that from one pier not being set over another a large portion of such piers instead of supporting the superincumbent weight act as ruinous burthens upon the remaining parts of the pier, it will be found that the quantity of effective Brickwork is often so reduced as to cost more than £100 per rod: and indeed it is almost a mistake to say that any of it is effective while in jeopardy from defective nature and mal-construction.

It is universally admitted that *English-bond* is the mode in which Brickwork can be put together with the greatest strength,—(Plate I., fig. 2,) for in no part of such work, when properly done, does joint come over joint, and it does not require small pieces of brick to fill up the work; moreover it may and ought to be done entirely with whole bricks, except the "*closers*" near its angles, requisite in order to adjust properly the bond. Whereas *Flemish-bond* (Plate I., fig. 3) requires of necessity through its whole structure a multitude ofsmall pieces, and possesses the additional inconvenience of having throughout its structure· a series of coffers (filled with unbonded work) which extend perpendicularly from the base to the summit of the work.

It is customary to consider *Flemish-bond* as indispensable for the external facing of even the commonest descriptions of buildings; hence there is license given for the most defective workmanship; for as in general bricklayers use for all work out of sight the *English-bond*, they make the insides of external walls of *English-bond* and the outsides of them of *Flemish-bond*, and thus much irregularity and breach in the bonding of the work ensue. In order to avoid this evil the author, for some considerable time past, has had all his external walls, except those of principal fronts, executed entirely within and without in *English-bond;* and he would have adopted the same mode of structure even in principal fronts had he not been restrained by the fear of increasing the proportion in the quantity of *facing-bricks* which are in general much softer and inferior in goodness to the description of grey-stock bricks which he in general uses: and this imperfection of the ordinary *facing-bricks* has almost induced him to lay aside altogether the ordinary *facing-bricks*, and to make his walls only of moderate thickness; but within and without entirely of the very best *malm paving-bricks*, a description of

material which he believes to be the most excellent for walls; and this would remove altogether the imperfection of softness, and the want of tie, in the ordinary facings of brick-work; for by the ordinary mode of carrying into the body of the work the "*headers*" of but every alternate course, only one sixth part of the superficial extent of the facings can be tied into the work (Plate I., fig. 4); and when it is considered how many of the "*headers*" break off while the workman is laying them, how many he omits from carelessness or fraud, and how many of them are short when used,—it will be found that only about one-eighth part of the superficial extent of the work is bonded,—and in common bad ordinary work the tie is reduced to one-tenth;—and the author has seen work in which it was reduced to less than one-twentieth of the superficial extent, and acted rather as a burthen than a support to the brick-work. But if a wall bebuilt wholly of *malm paving-bricks*, the facing, if the work be in *Flemish-bond* will have one-third of its superficial extent bonded in, and if of *English-bond* one-half of its superficial extent will be bonded. (Plate I., fig. 5.)

By the ordinary mode of bonding in only the "*headers*" of each alternate course two thirds of the extent of facing throughout the work, are separated from the back-work by a series of perpendicular joints extending from the base to the summit of the work. See section from *c* to *d*. (Plate I., fig. 4)

The author believes that if the favour in which *Flemish-bond* facings are held be not altogether a prejudice, the superior soundness of facings of *English-bond* ought to prevent the use of *Flemish-bond* in most cases where it is now adopted.

It is of the greatest importance to reduce brick-work to the smallest possible dimensions; for besides the saving of the carriage of the materials, the foundation is thereby disburthened of a crushing heap. In many parts of structures their grace and convenience depend solely upon the ability to reduce the bulk of their substantial component parts; and moreover, every proprietor has a natural inherent feeling against the occupation of the site of his habitation by an useless bulk of materials: and the disparity in favour of the quantity of permanent strength to be produced out of a given sum of money by the use of good materials and good workmanship should for ever, with the wise and truly economical, banish inferiority. The wonder with which mankind in general view a small quantity of materials reared by delicate art, should be sufficient inducement for the architectural practitioner to take some pains in this respect.

The author has sometimes under peculiar circumstances, run up to a considerable height walls in their principal parts no thicker than 9 inches and has been cautioned against this; but he has found although he could not get the brick-work executed to his satisfaction these walls from even the moderate care which has been used in their formation have remained without flaw,—

Fig. 1.

a. Ichnography (inverted) of the pots : 4¼ inches square at the head, and 4¼ inches diameter at the soffit.
b. Section of the pots :—length 7½ inches ; thickness, ½ inch average. The hole through the soffit of each pot forms a key for the plastering.
c. Perspective view of the pots, showing the rough spiral marks scratched upon their exteriors to hold the mortar.

Weight of each pot, only 3lb 4oz.
Weight of a mass of solid brick, of the same external dimensions, 5lb. 4oz.

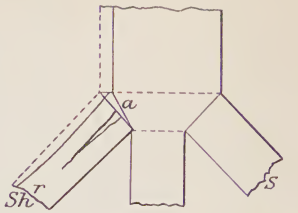
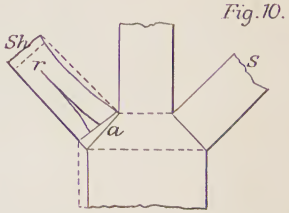


Fig. 10.



S. S. A Principal and a Strut framed with close abutments into a king-post or suspender of new timber.
Sh. Sh. A Principal and a Strut originally framed with close abutments, but afterwards straining each upon one angle on account of the shrinkage of the timber rendering the abutments, *a, a,* less inclined.
r, r. Rents frequently caused to the timbers by the irregular strain resulting from the shrinkage.

English-Bond of Brick-work.

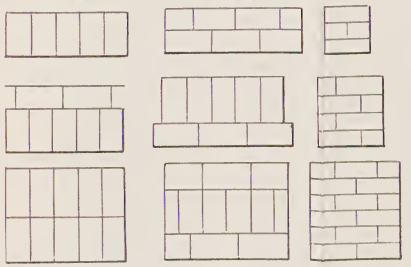

Plans of the 1st Course.
Plans of the 2nd Course.
Sections.
Work one brick thick.
Work one brick and a half thick.
Work two bricks thick.

Fig. 2. Flemish-Bond of Brick-work.

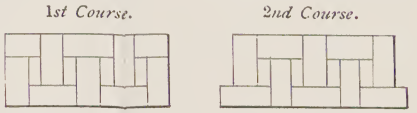


Fig. 3.

Brick-work Faced with Malm Stocks.

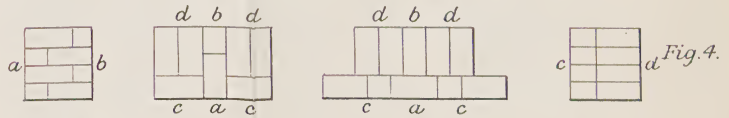


Fig. 4.

Section from a to b. — *Plan of the 1st Course.* — *Plan of the 2nd Course.* — *Section from c to d.*

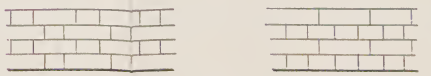


Fig. 5.

Malm Stock Facings in Flemish-bond. The only Bricks which tie the facing with the body of the wall.

Facings of English-bond.

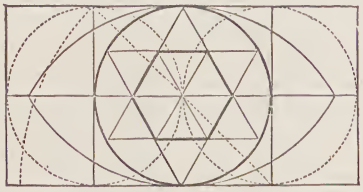
London : Crosby Lockwood and Co., 7, Stationers' Hall Court, E.C.

while walls much thicker, raised by those who gave him their advice, have in a few months cracked and fallen to ruin because they were worse constructed and were reared contrary to all static principle.

Of how much importance it is to reduce the bulk of the component materials of an edifice to the smallest bulk which safety will allow is the circumstance of the fondness with which so many persons view the adoption of small coarse and proportionless pillars of iron in preference to the most beautiful piers and columns of either *Grecian* or even *pointed architecture.*

Perhaps no other description of work executed at the present day in England, calls for such asperity of condemnation as much of our London brick-work: where it is to be exposed to view it is too often bad enough; but where it is to be concealed as is so often the case by vicious plaster finery, *one half the expense of which might have made it work indeed,* no pen can describe adequately its abominations, its pseudo-arches, its want of bond, its shattered condition, its internal uncemented state, and its general badness of materials.

Of geometrical science in architecture.



" On en trouue d'autres, quoy que rarement a la verite, qui " ayant bien establi leur première estude sur les principes de la " Geometrie auant que de trauailler, arriuent après sans peine et " asseurément a la connoissance de la perfection de l'art, ce n'est " q'uà ceux-lá que ie m'addresse."—*Paralèlle, by Roland Freart, Sieur de Chambray, p.* 2.

During the middle ages, geometrical science was applied to architecture in the loveliest manner: the general plan, the columns, the arches, the doors, the windows, the galleries, the vaultings, the flying-buttresses, every panel, every compartment, the most minute ornament, exhibited an intimate acquaintance with that profound and masterly science, without which building becomes vicious, cumbrous, expensive, mean, fragile, absurd, and

disgusting*: a single superficial foot of Moresco paving contains more delicate geometry than is to be found in many a modern English building of high assumption which covers several acres of ground; many of the porcelain wall-linings of the Moors are covered over with figures of such geometrical intricacy that none but those possessed of a very considerable degree of geometrical skill could have designed them: the celebrated tower of the Giralda at Seville, the architecture of which is ascribed to *El Geber*, the reputed importer to Europe of *algebra*, is covered all over with geometrical forms. After the decline of Gothic architecture a foolish notion went abroad in the world, that cumbrousness and extravagance of material, were the characteristics of Gothic architecture; even that great and talented man John Evelyn, who possessed a very superior knowledge of architecture, entertained the then current opinion: but of late mankind have become strangely undeceived upon this point; and the plans and sections of ancient and modern buildings, brought together in parallel, now fill the mind with astonishment that so comparatively small a quantity of materials, and those frequently of mean quality, could have been piled up to exist with little failure or decay such a long course of time: it is not that Gothic buildings are always perfect in construction, but in general they are nearly so; in fact so light are some of them, that they need more substance as well as harder materials to resist the mere operation of time upon their surfaces. The Gothic architects always built with the greatest economy: when square stone was easily procurable they formed their walls very thin, but where from the length of the carriage of it, it became costly, they used for their walls the most ordinary rubble-stone of the country, and they then gave to their walls thickness sufficient to prevent them from rending and rolling apart from the fluent nature of their materials. Saint Paul's Cathedral, the most scientific and successful work which was ever erected, contains in addition to the superb nature of its masonry, a proportionate bulk of materials, enormously greater than the Gothic cathedrals, alike in its piers, its foundation, its arches, its walls, and its vaultings: probably Wren could have poised up his work, using as little of material as the Gothic architects, but he aspired to something more: blessed by circumstances, with an unity of plan and superior materials, he aimed at length of duration; and the bulk of his work will probably

* To such an extent was the love of geometrical forms carried by the mid-eval architects and sculptors that not only were crowns and mitres enriched with ornaments of geometrical figure, but even sceptres, crosiers, sword-belts, buckles, sword-handles, mail-clasps, scabbards, finger-rings, brooches, sleeves, fringes, borders, cushions, biers, stools and tables, were so embellished. Some examples of these applications of geometrical forms are to be seen in Stothard's exquisite work, *Monumental Effigies of Great Britain*, with *Introduction and Descriptions* by A. J. Kempe, London, A.D. 1813–32.

PLAN OF THE CENTRAL PART OF ST. PAUL'S CATHEDRAL, LONDON.

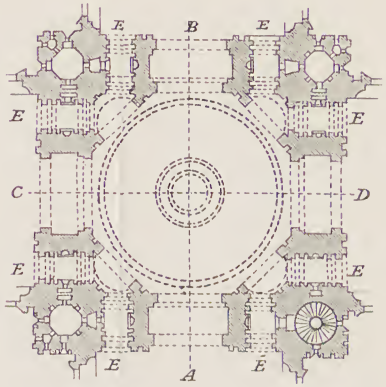


Fig. 1.

A. The Nave of the Cathedral.
B. The Ante-choir.
C. The Northern Transept.
D. The Southern Transept.
E. E. E. E. E. E. E. E. The aisles of the Nave, Ante-choir, and Transepts, which possess vistas from one to another, through the central Octagon of the Church, in the same manner as those at St. Paul's Cathedral, London.

PLAN OF THE TEMPLE OF VENUS AT BAIA.

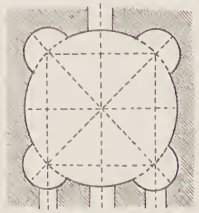


Fig. 3.

PLAN OF THE CENTRAL PART OF ELY CATHEDRAL.

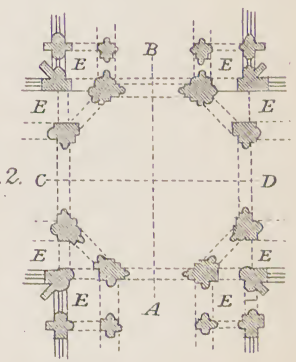


Fig. 2.

A. The Nave of the Cathedral.
B. The Ante-choir.
C. The Northern Transept.
D. The Southern Transept.
E. E. E. E. E. E. E. E. The aisles of the Cathedral, all meeting, and possessing clear vistas every way through the dome of the Cathedral.

London: Crosby Lockwood and Co., 7, Stationers' Hall Court, E.C.

remain when every particle of the present Gothic cathedrals has disappeared.

The works of Wren were a splendid revival of geometrical science; to a foreigner it must indeed seem strange that except Saint Paul's Cathedral his works are very little known to even most resident London architects. De Quincy, in his *Histoire de la Vie et des Ouvrages des plus Celebres Architectes*, vol. ii. page 251, thus expresses himself: "*On peut s'etonner qu'il n'ait* "*point été fait de recueil gravé des édifices que cet architecte,* "*dans le cours d'une longue vie, parait avoir construits en* "*divers lieux de l'Angleterre. On en est réduit à de simples* "*mentions de son biographe, mentions insuffisantes pour faire* "*juger de la valeur d'ouvrages qui, s'ils se sont conservés, auront* "*du éprouver plus d'un changement.*"

The geometrical management of the Dome of Saint Paul's Cathedral, in beauty and science, outstrips all other works, both ancient and modern: in addition to the masterly manner in which the inner dome, the cone, the lantern, and the external covering of the cupola are contrived, and which are worthy of the most attentive study by the architect, the engineer, the geometrician, and the man of general science,—the grand scientific and artistic master-stroke of this fine edifice, is the unrivalled manner in which the Dome and the twelve internal avenues of this church unite without intercepting each other: this is the most successful triumph which geometry has ever achieved in architecture: the science of the Gothic architects was exceedingly great, but nothing so great in art as this is contained in their works, though some may admire the particular taste of them more than that of St. Paul's Cathedral. (See Plate II., fig. 1.)

It is doubtlessly probable, that Wren caught the beautiful and magical idea of the cross vistas of the aisles of his church from the central part of Ely Cathedral (see Plate II., fig. 2), of which his uncle was Bishop; but then the celebrated octagon of Ely Cathedral, however beautiful, could teach him nothing of the mode wherein the spandrel-spaces in which the eight side aisles at St. Paul's meet in pairs, are vaulted over with sections of hemispherical domes. And, indeed, if examples be sought for, the germ of the plan may be found in that of the ancient temple of Venus, at Baia; but we have no knowledge of Wren's acquaintance with this. (See Plate II., fig. 3.)

The simple geometrical secret once disclosed, it is in many cases readily adaptable; and one fortunate instance of this adaptation is to be seen in the Bank of England, where Sir John Soane having to make from the south entrance-court a new entrance to the great Rotunda, which lies askew from the court, overcame the difficulty successfully by some way in bending the passage to it to an angle of 45° beneath a small triangular section of a dome, similar to the four spandrel-domes at St. Paul's: here the belting

arches of the ceiling span correctly across the plan in straight lines are of simple construction and fit exactly the section of a dome. Not so that of the embouchure of the passage into the Rotunda, for there cutting into a semi-circular alcove to the spherical head of which it does not ascend, the arch becomes circular also on the plan, and thence distorted and weak, though much more difficult of execution.

After a student in architecture has acquired a fair knowledge of arithmetic and mensuration, he should acquaint himself thoroughly with the sections of spheres; this he may do from balls of wood or other materials; and the result will be, that in a very short time he will out-distance in practical scientific architecture all his competitors who pursue a different course; while he who merely attends lectures, at which little is to be acquired beyond the most superficial knowledge of the orders of architecture, (and which can in general be much better acquired from books) or who occupies all his time in making designs before he has acquired a solid elementary knowledge of art and science, will wholly fail.

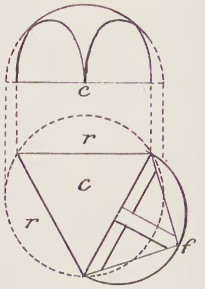
It is not that he is to expect his designs to be chosen for their science, in competition with others: for he would wait long before he found judges in such cases able either to discover or to appreciate the science of his design, the public in general being perhaps less acquainted with the Practical Science of Architecture than with any other art, although every man's worldly estate and convenience are most materially concerned with it: but after he shall have once found opportunity of showing his skill, accompanied by integrity, and by even a very moderate degree of taste, he will be sought for as one who can overcome difficulties, and upon whose ability reliance can be placed. Let him not forget, that Smeaton was sent for to build the Eddystone Light-house merely from his known scientific acquirements, before he had built anything, and that this great man's skill and caution soon made him one of the greatest of engineers.

Some of the most useful sections of spheres, cut to suit vaultings to ground-plans of different shapes are shown on Plates III. and IV. The curvilinear surfaces of all the twelve Examples of Domes here given are generated from Hemispheres of the same diameter, the centres of which are marked by the letter *c.*, the letter *r* indicates the *portions of the Hemispheres which are retrenched:* and against the letter *f* are given the *face-ribs* of the arches uniting the walls with the Domes.

Of the three different great constructive principles in building.

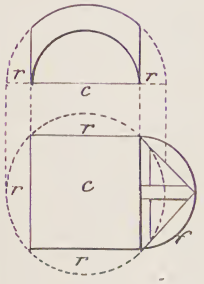
In disposing the materials for the construction of buildings, there are *three* distinct great principles called into use:—

SIMPLE REPOSE, EQUIPOISE, TIE.



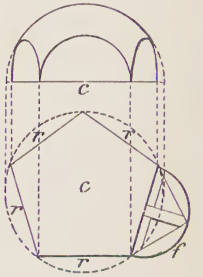
No. 1.

HEMISPHERICAL DOME, cut to fit a Plan in the form of an EQUILATERAL TRIANGLE.



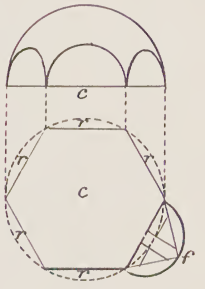
No. 2.

HEMISPHERICAL DOME, cut to fit a Plan in the form of a SQUARE.



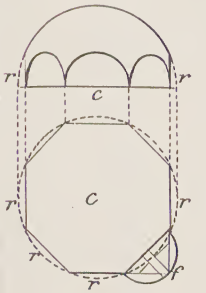
No. 3.

HEMISPHERICAL DOME, cut to fit a Plan in the form of a PENTAGON.



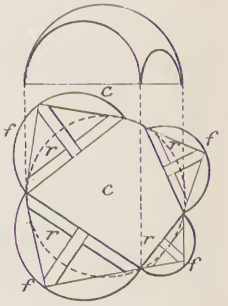
No. 4.

HEMISPHERICAL DOME, cut to fit a Plan in the form of a HEXAGON. *The Plan may be made with the sides of it alternately differing, or like an Equilateral Triangle with the angles cut off.*



No. 5.

HEMISPHERICAL DOME, cut to fit a Plan in the form of a REGULAR OCTAGON. *Any other number (even or uneven) of sides may be chosen for the Plan.*



No. 6.

HEMISPHERICAL DOME, cut to fit an IRREGULAR Plan, the angles of which TOUCH THE CIRCUMFERENCE OF A CIRCLE. *This instance is given in order to show that an irregularity, either obvious or imperceptible, does not of necessity prevent an apartment from being covered with a dome.*

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The object in all these three distinct principles is the production of such a state of quietude in the materials of a building that their weight shall not produce any fracture or displacing of them.

Of simple repose in the construction of buildings.

The principle of SIMPLE REPOSE in the construction of buildings *is used where the materials are merely piled up perpendicularly so as to form piers or columns, with cross-beams, architraves or lintels* laid *horizontally upon the piers or columns, pressing downwardly merely with the gravity of the materials, without any thrust or other inclination to destroy the position of any part of the arrangement* (see Plate V., fig. 1.) All very ancient buildings are formed upon this principle. This construction is destitute of all science, yet it is, as far as its capabilities go, more perfect in its application than any other construction: this is proved by the enormous duration of the temples of the Egyptians, Greeks, and Druids, which were formed upon this principle: it needs no calculation for obtaining equipoise, or for the avoidance of the pendent materials wedging apart those supporting them: buildings so constructed need only tenacity of material and unflinching foundations to be altogether perfect in construction: but buildings of this kind, owing nothing to geometrical science, lead to an enormous consumption of materials; all the materials of the horizontal spanning masses of even a small building must be huge, and are thence immensely expensive to procure and to raise to their destined places; if these spanning masses be either so long or so brittle as to yield by their own weight, or by that which may be put upon them, the principle of *Simple Repose* becomes destroyed; the horizontal masses sink and the piers or sustaining masses are thrust outwardly (see Plate V., fig. 2). From the many columns, or props, required for the support of a roof or covering upon this principle the internal space is greatly impeded. This manner of building affords great external beauty but leads to internal comparative uselessness; hence most of the large Grecian buildings, as temples and theatres, were left roofless.

Of equipoise in the construction of buildings.

Equipoise in the construction of buildings is made use of where smaller, even the smallest, materials, are piled up, building

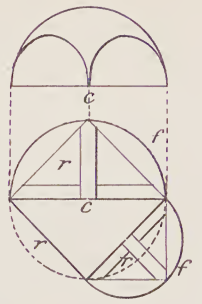
arches upon piers or columns: this principle, *being the means by which science enables us to overcome the smallness and meanness of materials*, admits of the grandest masses being reared cheaply: theoretically it should be perfect; *but from the complicated principles which it involves it is very frequently more or less imperfect*; but even with its frequent practical imperfections it has proved for many ages the means whereby man is enabled to arch, to vault, and to dome over, large buildings in a manner in which he otherwise could not.

Almost all simple arches and vaults have a tendency more or less to thrust apart the abutments which support them; to prevent this disastrous effect these abutments require to be sufficiently weighty, or even to have a tendency directly falling towards the thrust of the adjoining arches or vault, so as by counter-gravity to counteract their expanding property.

The flatter the segment of the circle composing an arch or vault the greater the thrusting or wedging power of the arch or vault against the abutments; consequently, the greater must be the strength and gravity of the abutments to counteract the otherwise irregular settlement of the work. *This is equipoise.*

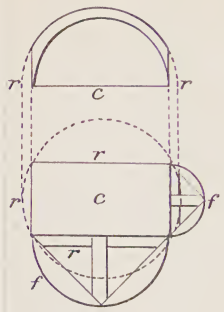
Again, there is another grand instance in which *equipoise* is demanded. All semi-circular or segmental arches, vaults, and domes, if consisting of a crust of materials *equally thick all over*, that is, with their internal and external curvatures which are technically called the *intrados* and *extrados*, concentric or parallel to each other, in all such arches, vaults, and domes, the upper materials being least supported by the abutments are most in jeopardy, have a more direct tendency to fall by their own weight, and becoming thus depressed, they wedge upwardly the materials next them at those parts of the curve which are vulgarly called the haunches of the arch, vault, or dome, forming a distorted curve, and frequently leaving vents in the work, near the parts *x x* (Plate V., fig. 3); now a dome or cupola being formed, as it were, by a succession of half arches meeting together at the crown, *if that crown became depressed it must force out the haunches of the work all round in a circle at the parts x x*; and *this same quantity of solid materials being forced to occupy a greater circumference the enlargement can alone take place by openings or vents occurring there:* from this very defect some of the grandest cupolas in the world have become greatly endangered, and some have wholly failed.

To *remedy* this *ruinous defect* it becomes necessary to *add upon the haunches of arches and vaults weight sufficient to hinder them from flying up* and thus *prevent their crowns from falling down.* In arches in ordinary walls weight upon their haunches is usually of necessity obtained by the ordinary process



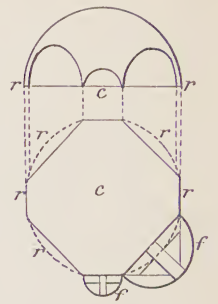
No. 7.

HALF A HEMISPHERICAL DOME similar to No. 2, cut to fit a Plan in the form of an ISOSCELES RIGHT-ANGLED TRIANGLE. *This is the form of the Domes under which the side aisles of St. Paul's Cathedral meet next the Dome.*



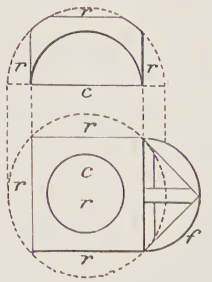
No. 8.

HEMISPHERICAL DOME, cut to fit a Plan in the form of a PARALLELOGRAM. *Of this kind are the Domes over the side aisles of St. Paul's Cathedral.*



No. 9.

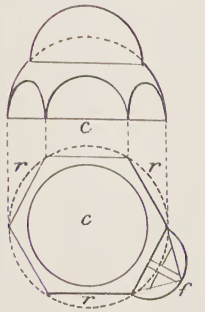
HEMISPHERICAL DOME, cut to fit a Plan in the form of an OCTAGON WITH SIDES ALTERNATELY DIFFERING. *The four smaller sides of the Polygon with the arches over them may be omitted, and the Dome will then spring from four curvilinear Piers.*



No. 10.

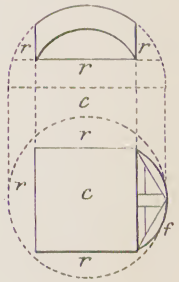
FRUSTUM OF A HEMISPHERICAL DOME, cut to fit a Plan in the form of an exact Square, and finished with a flat ceiling or with a skylight. *The heads of all kinds of domes may be truncated away in the manner of this dome.*

Between the eight great central arches and the Whispering-gallery of St. Paul's Cathedral is a Frustum of a Dome like this, with an Octagonal Base like No. 5.



No. 11.

FRUSTUM OF A HEMISPHERICAL DOME, cut to fit a Plan in the form of a Hexagon, and surmounted by a smaller *complete* Hemispherical Dome. The same Frustum may be surmounted by another Dome of any shape, by a Cylinder or *Drum*, or by a Conical collapsing Pilastrade, as in St. Paul's Cathedral.



No. 12.

UPPER SECTION OF A HEMISPHERICAL DOME, cut to fit a Plan in the form of an exact Square. *All the lateral arches cutting into this kind of Dome, have their curvatures struck from the same altitude as that from which the spherical surface of the dome is struck.*

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of carrying the walling up to its destined height; and the backs of vaults are in general filled up solidly nearly to a level with their summits; but in cupolas, which are raised for shapely magnificent external ornaments to cathedrals and other grand edifices, the required beauty of external outline almost forbid an equipoise in the thickness of the crust of the work, without an enormous sacrifice of materials, and danger to the foundation from the weight of the upward work; hence to produce the requisite effect some of the noblest energies of the scientific mind have been called into action; not the least display of this is the use of the intermediate conical dome, as at St. Paul's Cathedral, which besides having no tendency whatever to fly out at the haunches is able also to bear the heavy surmounting lantern, or spire, and is itself in fact a steeple.

And with regard to this last most admirable piece of secure science it has been judiciously observed, that the weight of the timber-work and covering of the outer dome of St. Paul's Cathedral tends to prevent any possible outward spread of the cone itself.

"Le mur de la tour conique est élégi par quatre rangs de "fenêtres qui éclarient l'intèrieur de la charpente; le bas "de cette tour est contrebutté par trente-deux murs en éperons "tendant au centre, ils sont compris entre le mur de l'attique "qui est audessus de la colonnade extérieure et le mur de ladite "tour.

"Les éperons servent aussi d'empatement pour porter l'en-"rayure de la charpente du dome. Cette charpente est composé "de trente-deux demi-fermes, appuyées d'un coté sur l'éxterieur "de la tour conique, et portant de l'autre une courbe pour former "le galbe du dome ou la coupole exterieure. *Il résult de cet "arrangement, que tout le poids de cette charpente et du plomb "dont elle est recouverte, sert à contre-venter la tour conique.*"— Jean Rondelet *Traité Theorique et Pratique de l'Art de Bâtir*, 6th Edition, vol. iv., p. 388.

A frequent instance of the violation of the principle of equipoise is to be found in the roofs of buildings occasioned by the slanting sides of them being either of unequal dimensions or covered with materials of different densities: if the rafters be longer and more ponderous on one side of the ridge than on the other, the weights (W w, Plate V., fig. 4) cannot counteract each other, but the greater weight will thrust over the ridge A towards B. Again, if the rafters be equal, but the covering of one side of the roof be heavy as of plain-tiles, and of the other side light as of slates, the same effect will occur, and the more ponderous covering A overpowering the gravity of the lighter covering B, the ridge C will be driven towards D. (Plate V., fig. 5.)

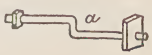
Those who are careless in the adjustment of their buildings,

or who cannot duly feel the shame of fracture in them, may argue that they have provided strength enough to resist all such effects: however this may be (and it may well be doubted) no additional strength ought to be required for any such purpose; for a small quantity of materials put together artificially by a due knowledge of gravity and dynamics, must be more secure as well as more economical than heavy masses, which, being ill at rest, strain every joint of the rafters and trussed work, operate against every wall, and leave nothing as it was originally intended to remain.

Of tie in the construction of buildings.

Tying is the third great principle in the construction of buildings; and is comparatively of modern invention. That state of rest, which the ancients endeavoured to obtain by the principle of *simple repose*, and by *equipoise*, is, by the *principle of tying*, obtained through confining the thrusting power, not by external abutments and equipoise, but by *internal restraint;* it leads to the most exquisitely simple and beautiful mechanical contrivance perhaps ever invented: this contrivance is technically called a Truss: nothing can be more simple, yet nothing requires more care in its construction; it contains in itself the seeds of ruin and the safe and perfect cure for it: the *inclined beams* forming a truss would be violently striving to work the ruin of the building by thrusting apart and throwing down its walls, but the *horizontal tie-beam* restrains them. *The inclined beams must not reach the walls;* they must *only come upon the tie-beam;* then while the tie-beam remains unbroken *the truss lies simply with its bare weight upon the walls:* there is then *no thrust, no cross-strain* upon the walls; such a mechanical contrivance is the most wonderful economiser of materials; it may be applied, more or less simply, in a thousand different ways; well applied, it gives to every part of a building, however large in dimensions, that state of rest which the earliest buildings of antiquity possessed; while it enables man, with roofs, beams, floors, galleries, hanging partitions, and platforms, to span enormous widths, which the ancients never could without a prodigious outlay, and frequently not without great inconvenience.

All ties made use of in buildings should be either straight or only *cambered* or curved upwardly enough to allow for that downward settlement which mostly takes place in all pendent materials. No crooks should be made in ties whether of iron or other materials; if an iron tie be bent thus,



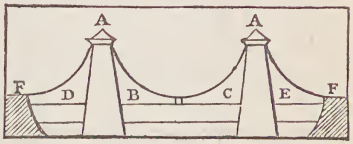
either it has no strain to counteract, or it will soon gradually straighten at the bend *a*, and thus lengthening will offer no restraint to the moving power. When ties form complete

hoops or circuits, as those round a dome or a steeple, they should if possible be each in one piece or at least in as few pieces as possible, and they should lie horizontally in every part.

Of the union of the several great principles of construction in buildings.

Most modern buildings contain more or less of the *Three* several great principles of construction combined together.

A suspension bridge, contains all the three principles: thus at the points A A the chains should merely lie, if possible, with nothing but their mere gravity in simple repose: again, the divisions B and C of the chains should be in exact equipoise with the outer divisions of the chains D and E; thus the whole would be equally balanced as exactly as a scale-beam, with the towers supporting the fulcrums A A merely compressed downwardly without being strained or thrust from their original situations and form, and at least without any but equal strains. And thirdly, as the chains of the *catenary* are striving by their own weight to disengage themselves from the shore at the two points F F, they call into action the third principle of tie, to restrain them.



The theories of catenary bridges are very perfect; but then the mechanical arrangement of them is so sensitive that the slightest addition of weight especially that of a passing carriage or of a file of soldiers, deranges their equilibrium and produces such an alteration that rollers are required for the free action of the chains at the fulcrums A A: added to which inconvenience, there is a prodigious inclination to fracture at the points F F; and yet with these defects, suspension bridges are so very beautiful, they are so economical, so capable of being erected where no other bridges perhaps could be erected that they form one of the noblest, most useful, and most successful inventions of man. Other bridges *thrust against* the shores—suspension bridges *draw away violently from* the shores. If Engineers ever succeed in rendering their horizontal roadways by longitudinal beams and braces so unflinching that they will not shrink in length by the efforts of the external chains at F F, then may such bridges merely lie upon abutments at their junctions with the shores; and while their chains themselves last no fracture may be feared.

It may be observed that some of the suspension bridges which have failed have not had their four great divisions adjusted in equilibrio:—if such an adjustment be not the principle of its design a suspension bridge will have its fulcrum-towers drawn

over from the perpendicular, and an increased strain will be given to the abutments of it. Some of the handsomest and best suspension bridges, as that of Hammersmith and the present Pont des Invalides at Paris, are formed nearly with an equalization of the gravity of their four great divisions.

Gravity the source of all principle and defects in architectural construction.

Gravity is the source of all the principles, inventions and ingenuity called into action in the structure of architectural works. The weight or downward-tendency of their materials, is the cause of buildings holding together or falling, or being thrust apart. *Gravity in its various dynamic modifications* is the sole acting power which operates in a building, unless forces (as of machinery) be applied which are not usually applied within a building. The *gravity* of an *imperfectly* formed roof, *thrusts out* and sometimes even overthrows the walls; the *gravity* of a *perfectly* formed roof holds those walls together: the gravity of a sinking floor draws *in* the walls of a building: the gravity of a common valley roof, by leverage *expands* and overthrows the walls: the gravity of the different stones composing a column, holds them firmly together: the gravity of the voussoirs of an arch constructed properly (if possible) causes all those voussoirs to press with an equal weight towards the centre of the curve: the gravity of stone vaulting operates against the walls of a church, and the gravity of the flying-buttresses counteracts that active force.

All the mechanical perfections of scientific building result from a clear knowledge of the operations of gravity, and from the ability to direct their course: all the mechanical defects of buildings result from an ignorance of the laws of gravity, and from inattention or from inability to counterbalance their effect. A judicious architect enslaves to his purpose the active force of gravity, and compels it to exert *all* its force in holding together more firmly his structure: an ignorant or careless architect or workman allows that force to exert itself in wracking, straining, distorting, breaking and destroying his work.

By far the greater portion of the generic beauties of architecture (particularly of Gothic or pointed architecture) have arisen from an intimate acquaintance with the operations of gravity, and from the consequent art of restraining it.

This may be characterized as the age most eminent for the display in the major part of its buildings, of inattention to gravity.

A child, in piling up a fabric of cards, displays a far better knowledge of gravity and dynamics than the greater part of modern builders; were it otherwise, how could it ever have come into use to so enormous an extent,—so disgraceful and ruinous a

piece of mal-construction as the common V roof, which is either a roof turned upside down or two halves of a roof bearing upon void instead of upon walls, and by its gravity endeavouring to fall flat like an open book. No excuse whatever can be made for this shamefully absurd piece of ignorance and improvidence. The shallow pretence of saving one gutter is destroyed by the waste of timber in the gutter-plates and by the consequent extra altitude of the walls.

Of the three modes in which gravity acts upon materials.

Gravity (by their own weight and by the weight added to them) operates in three ways upon materials, which three ways, though so obvious, are frequently either so little known to the practical builder, or if known, are so little attended to, as to cause the most ruinous effects. (Plate V., fig. 6.)

Of these three operations *the first is the least destructive*, and when the force of compression is not too great it forms the principle of the best construction, and enters the most largely into all well-constructed buildings: all the materials which are placed in *simple repose* gravitate in this manner. (Plate V., fig. 7.)

A concentration of this compression occurs to the key-stone of an arch by its own gravity, by the weight bearing upon it, and by the gravity and lateral operation of the adjoining voussoirs. The same operation of compression occurs when a wedge or screw is forced under the base of a column or post, but gravity tends, on the one hand to draw away the apparatus and, on the other, to bring down upon the apparatus the mass forced upwardly. (Plate V., fig. 8.)

The same gravitation acts horizontally against a level strut set against a bulging wall, or other member of a building: it acts in the same manner against the abutments of a tie-beam by the operation of the principal-rafters, but in this case the force endeavours to rend them from the rest of the timber, and the abutments are usually assisted by a bolt or brace of iron.

The same operation occurs obliquely upon a strut set to prevent the bending in of a rafter; and this last description of compression occurs to the head of a Gothic flying-buttress caused by the drift of the vaulting.

The second mode in which materials are operated upon by gravity, viz., by *cross-strain*, is simply by pressure upon the longest side of a piece of timber, stone, or other material so as to bend or break it: all beams suffer a portion of cross-strain simply from their own weight; this is vulgarly termed *sagging;* and to counteract the evil effects of this, materials require a previous upward curvature termed a *camber*.

Gravity acting by *cross-strain* upon this *camber con*-cen-

trates the particles of the materials and renders them firmer: *gravity* acting by *cross-strain* upon materials *not so cambered ex*-centrates the particles of the materials and causes them to break easily.

The *struts* (sometimes improperly termed *braces*) of an imperfectly-formed roof enhance the cross-strain upon the tie-beams by punching them in.

An upward cross-strain is produced against the soffit of a bridge, tank, or drain, by the overflow of water, frequently to such an extent as to blow up the crown of the arched work; and the same effect frequently takes place by the sudden rising of springs under the bottom of an empty tank, which bottom has been laid flat instead of being counter-arched in order to resist the force of springs.

Gravity will even sometimes cause an upward cross-strain to the centres of beams by heavy walls loaded with a roof, sinking the foundation, while light story-posts or columns placed under the beams not having compressed the ground so much as the walls, the ends of the beams borne down by the sinking of the walls, the beams have become bent like immense *cross-bows* or *balistas*, and have thence sprung up in their middles. The author once knew a large and heavy building which was erected in a few weeks upon a soft foundation; in a short time the great timber girders of it bent in this manner full six inches, when at length the brick piers upon which the story-posts were set split in ribbons by the force exercised upon them; and shortly afterwards crumbling to atoms, the story-posts themselves were shot away down into the basement-story, and the beams were relieved from their unnatural flexure. This case is however rare, for story-posts and columns most frequently sink more than the walls, from the concentration of much weight upon small spots of ground. (See Plate VI., fig. 1.)

Cross-strain operates horizontally against the wall of a building when a horizontal strut is placed against it (without a counter-strut) to restrain the bulging or prevent the fall of another building: the same effect is occasioned by a vault expanding against the middle of a wall: a like effect is caused to the outer face-work or ashlaring of a wall by the rolling downwards and consequent bulging of internal rubble-work: the same injurious cross-strain, produced by the irregular settlement and bulging of brick-work, occasions slight window-jambs, door-jambs, and pilasters of stone to snap across their bodies. Cross-strain operates obliquely upon a principal-rafter by a purlin being set upon it without a strut beneath it in order to prevent deflexure.

The third mode wherein materials are affected by gravity, viz., by *tension*, in general causes less injury to buildings than either of the other operations of weight; for in general TENSION is not suffered by any of the materials in a building except such as are well able to bear it: simple direct tension is here intended; for

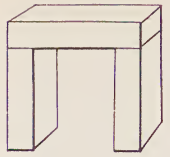


Fig. 1.

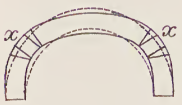


Fig. 3.

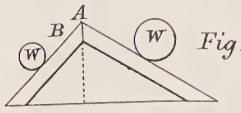


Fig. 4.

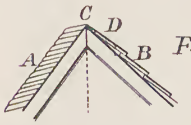


Fig. 5.

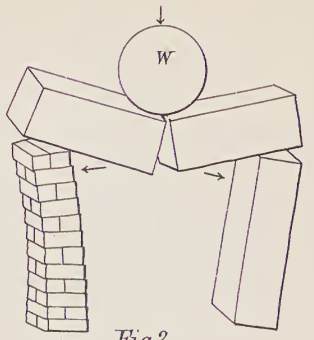
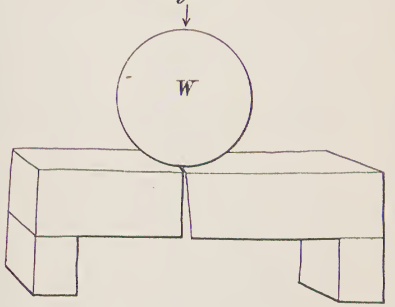
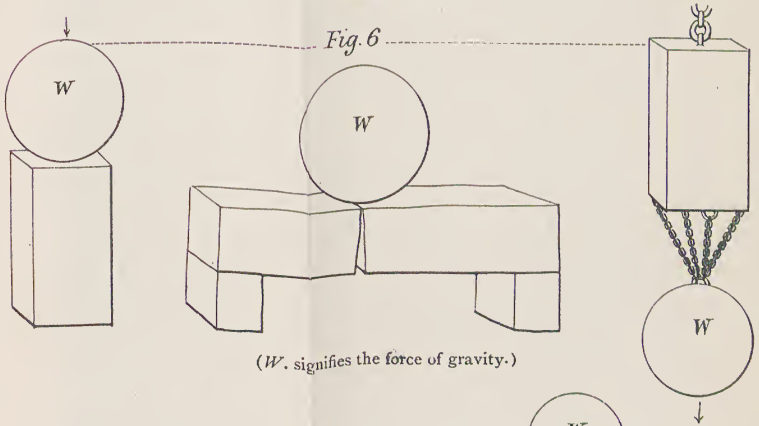


Fig. 2.



CROSS STRAIN. TENSION.

Fig. 6



(*W.* signifies the force of gravity.)

Fig. 7.

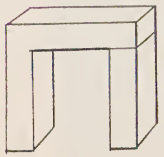
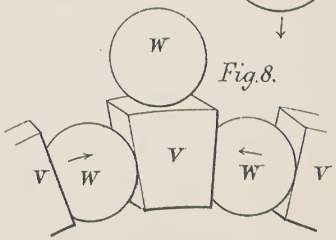


Fig. 9.

Fig. 8.



V. V. V. Voussoirs.
W. W. W. Weights pressing the central Voussoir.

London: Crosby Lockwood and Co., 7, Stationers' Hall Court, E.C.

indirect tension will mostly be found to be cross-strain. All tie-beams of roofs, suffer horizontal tension by the outward sliding upon them of the principal-rafters; all king-posts (*suspenders*) and queen-posts (*suspenders*) receive vertical tension by the suspension to them of the tie-beams, ceilings, &c.; but while gravity comparatively rarely does injury to materials by direct tension very frequently injuries occur to buildings by ties and suspenders not being so disposed as to receive direct tension by gravity, but to be borne down and inflected by it, and thus cease to operate in the direction intended: this is in effect as bad as gravity straightening crooked ties.

A very common effect of gravity upon materials intended to act by tension, is to be observed in those pieces of iron which are frequently set as *raking-ties* against chimney-shafts, but which, by their weight, drive over and cripple the work which they are intended to restrain.

Again, the links of a chain-bridge suffer violent cross-strain by the suspension of the roadway to them, but then each link which receives cross-strain most successfully resists deflexure in itself by the still more violent tension which it endures from the adjoining links, as well by their gravity as from the straining power given to them by the weight of the other parts of the roadway and chains.

On the mechanical trussing of buildings.

On the subject of the *mechanical trussing* of the roofs, floors, and quartered partitions of buildings, it is to be lamented that architects are not sufficiently acquainted with this beautiful, simple, yet highly scientific principle; to the neglect of which are owing so many of the failures in buildings. The whole principle, which can be understood in a few minutes by the most ordinary capacity, if properly explained, ought to be really understood by the meanest artificers employed about a building, and not only understood, but *every one connected with building ought to be so indued with the fear of forgetting the principle, as on no proper occasion to dispense with it.*

The first principle of the truss may be thus described; first imagine a plank laid across between two walls, with two rafters placed at an angle upon them, bolt the feet of the rafters to the horizontal plank to prevent them from slipping from their footing; and the plank must be placed edge-wise so as not to bend down by its own weight. In order still further to economise material; in order to support the centre of the rafters, a diagonal timber, technically called a strut, is carried from near the foot of the suspender up to each wrestling rafter, and thereby prevents it from sinking: *the strut must not be carried down to the horizontal beam, instead*

of to the foot of this suspender, as many ignorant persons carry it; for it would then tend to distress and sink the tie-beam, and to separate it from the suspender. (See Plate VI., figs. 2 and 3.) The whole system of mechanical trussing in buildings, however applied, is a modification of this principle.

When a truss becomes of more considerable length it is customary to suspend the tie-beam of it in *two* places by *two* pieces of material called improperly queen-*posts*, but which should with more propriety be termed queen-*suspenders*, or queen-*stirrups*. (See Plate VI., fig. 4.) This description of truss is like a truss with a king-post separated into two halves, and with a horizontal strut placed between the heads of the two halves of the king-post, in order to prevent the inclined beams or *principals* from being pressed together: this horizontal strut is termed a *collar*-beam, *hammer*-beam, or *straining*-beam; and sometimes a smaller collar-beam, termed a straining-*sill*, is placed upon the tie-beam, between the feet of the queen-*stirrups*.

Increasing the number of suspenders to the tie-beams, renders smaller and weaker timbers sufficiently stiff for the purpose of tie; and the *principals*, being also shortened, partake of the same economy.

Sometimes *three suspenders* are obtained to the tie-beam by forming a queen-truss within a king-truss, (See Plate VI., fig. 5); and this kind of framing will answer properly for a roof 60 feet or 80 feet span. Sometimes instead of one king-*post* this description of truss has two boards hung to the heads of the upper principals and extending down to the tie-beam; in this case the collar-beam is in one piece and passes between the two boards. There is yet another method of managing this king-post as practised more than 400 years ago at the Basilica of St. Paul at Rome. This was by splitting as it were the whole truss longitudinally into two separate lighter or half trusses and then keying the king-post between these two separate trusses, so as to form one mass. Suspenders of iron obviate this reduplication of the trusses. If it be determined to split each truss into two, it will be best then to place them only half as far apart as they would otherwise have been, and thus reduce the bearing, bulk, and burthen of the purlins, and hold in the walls at twice the ordinary number of places, and perform all this with a smaller quantity of material.*

The points of suspension may in this last description of truss be still further increased to *seven* in number, by screwing through the tie-beam *four* intermediate *queen-bolts* of wrought-iron hung to the backs of the principals.

The last-mentioned kind of truss may be simplified by using only *two* principals instead of four of them, and by making all the

* For this method of roofing see the article *Charpente*, in M. Viollet le Duc's *Dictionary of Architecture*, in which numerous plates and instructive diagrams are given.

suspenders of wrought-iron. Indeed there is no limit to the number of suspenders which may be used in this system of framing; the more these are in number the lighter may be all the parts of the truss except the two inclined beams or principals, which can only be lightened in proportion to the burthen which they have to carry. (See Plate VI., fig. 6.) The span of this kind of truss is only limited by the length of timber which can be obtained for the principals: 95 feet is the greatest length of fir timber which the author remembers to have seen in England, so that 150 feet or 160 feet is perhaps the utmost span to which this truss can be carried without scarfing the principals, which is unadvisable, as the more there are of such joints the greater will be the settlement of the framing.

All timber trusses are subject to very considerable downward settlement from their weight from the natural flexibility of the timber and from the shrinkage of it by drying: in order to counteract the effect of this settlement it is usual to form, at first, the tie-beams of trusses with an upward curvature, called a camber, so that after the unavoidable settlement has occurred, the tie-beams, with the ceiling or whatever else may be attached to them, may not droop down. But it must be observed that the deflexure of the tie-beams of trusses is increased by the reprehensible practice of framing the king-posts and queen-posts at first close into the tie-beams, by which practice the slightest depression of the principals by settlement causes the king-posts and queen-posts to punch in immediately the tie-beams, and thus to cause them to sink; whereas, if the king-posts and queen-posts be only attached loosely to the tie-beams by stirrups of iron, as is the case in the roof of the Theatre d'Argentina at Rome, and as was also the case in some of the trusses of the Basilica of St. Paul at Rome, all deflexure of the tie-beams may at any time be corrected by wedges or by screws, and thus a ceiling the most sunken may be restored to its original level.

The ordinary mode of forcing up a tie-beam to an excessive camber is very ignorant and reprehensible; for the tie-beam then, not only by its own weight but also by its natural spring, endeavours to recover its natural state of rest; and thus the principals become the more readily deflected and deranged; to draw up the tie-beam by screws or wedges, only after it is deflected, is to leave the principals free from all strain, except that caused by gravity.

In framing the principals and struts into king-posts and queen-posts of ordinary unseasoned timber, it will be well to leave the diagonal joints at first open, as shown at the letters *o*, *o*, (Plate VI., fig. 7,) so that when the broad heads and feet of the king-posts and queen-posts have completely shrunk and rendered the abutments more steep the principals and struts may fit closely, as shown at the letters *a*, *a*.

It should be a general maxim with the architect never to leave exposed to the weather members of buildings so important as trusses, whether of timber or of iron: if of timber they may rot and the fabric may thus become endangered; and if of iron, decomposition will take place and every thing around them be tainted with rust.

Dr. Robinson makes, with regard to the trusses of roofs, the following excellent remarks:—

"Nothing shows the skill of a carpenter more than the dis-
" tinctness with which he can forsee the changes of shape which
" must take place in a short time in every roof. A knowledge of
" this will often correct a construction which the mere mathema-
" tician thinks unexceptionable, because he does not reckon on
" the actual compression which must obtain, and imagines that
" his triangles, which sustain no cross-strain, invariably retain
" their shape till the pieces break. The sagacity of the experienced
" carpenter is not however enough, without science for perfecting
" the art. But when he knows how much a particular piece will
" yield to compression in one case, science will tell him, and
" nothing but science can do it, what will be the compression of
" the same piece in another very different case. Thus he learns
" how far it will now yield, and then he proportions the parts so
" to each other that, when all have yielded according to their
" strains, the whole is of the shape he wished to produce, and
" every point is in a state of firmness. It is here that we observe
" the greatest number of improprieties. The iron straps are
" frequently in positions not suited to the actual strain on them,
" and they are in a state of violent twist, which both tends strongly
" to break the strap and to cripple the pieces which they sur-
" round." — *System of Mechanical Philosophy.* Sir David Brewster's edition, Edinburgh, A.D. 1802, vol. 1, p. 60. § 576.

There are two observations more to be made concerning mechanical trusses: the first with regard to *struts*, and the second with regard to the *feet* of principals.

With regard to struts, it seems to be rather extensively imagined that they are as much placed according to some vain ideas of symmetry, or of particular inclination, as for any useful purpose; whereas it should never be forgotten that their only use is to prevent weak principals from being deflected by purlins or other burthens: therefore struts in trusses should be as numerous as, but for the struts, would be the deflected parts of the principals; and they should be most exactly directed to the points of the principals which, but for them, would be deflected: thus it may happen that two or even three struts may emanate from the foot of one king-post or queen-post, and counteract the pressure upon the principal from as many purlins.

With regard to the feet of principals, it is to be observed, that many of our modern trusses are exceedingly faulty, from the

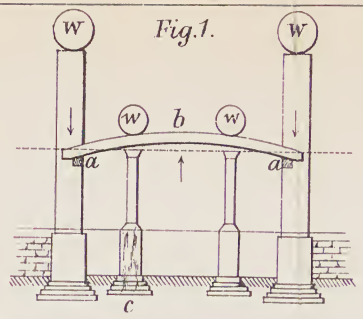


Fig. 1.

a a. Ends of the beams carried down by the superior Weight (*W. W.*) and sinking of the lateral walls.

b. Centres of the beams sprung upwards by the ends *a a* of them descending, the story-posts or columns forming fulcrums for the leverage, through being less depressed by the minor gravity or forces *w. w.*

c. Pier of brick-work crushed and split by the combined forces *W. w.* and the spring of the beam.

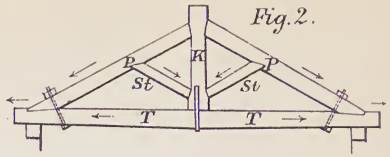


Fig. 2.

P. P. Principals.

T. T. Tie-beam preventing the Principals from expanding.

K. Suspender hung to the heads of the Principals, holding up the Tie-beam in its centre, and improperly termed a King-*post*, but more correctly termed a King-*stirrup*.

St. St. Struts abutting upon the King-stirrup, and preventing the Principals from bending inwards by their own weight and weakness, and by the burthen which the *Truss* may have to bear.

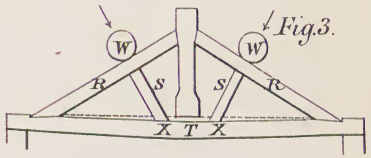


Fig. 3.

R. R. The Rafters or Inclined Principals.

W. W. Weight straining the Rafters or Principals.

T. The Tie-beams.

S. S. The Struts bending down the Tie-beams at *X. X.* by the Weight communicated to them at *W. W.*

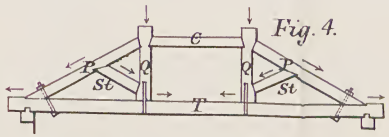


Fig. 4.

P P. Principals. *T.* Tie-beam.

Q. Q. Queen-*stirrups* hung to the heads of the Principals, and suspending the Tie-beam in two places.

St. St. Struts abutting upon the feet of the Queen-stirrups, and supporting the Principals.

C. Collar-beam, *Hammer*-beam, or *Straining*-beam.

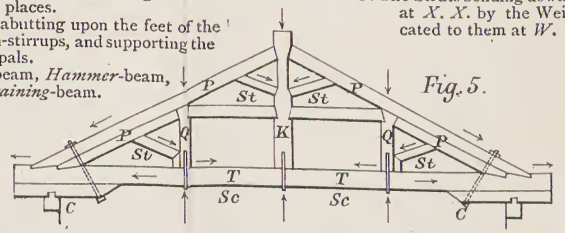


Fig. 5.

P. P. P. P. Principals. *T. T.* Tie-beam.

K. King-*stirrup* hung to the heads of the *upper* Principals, and sustaining the Tie-beam in its centre.

Q. Q. Queen-*stirrups* hung to the heads of the *lower* Principals, and sustaining the Tie-beam between its centre and its ends. The *upper* Principals may also be made to support more of the burden by passing round them iron straps from the heads of the Queen-*stirrups*.

St. St. St. St. Struts abutting upon the King-*stirrup* and Queen-*stirrups*, and supporting the upper and lower Principals.

C. C. Collar-beams between the King-*stirrup* and Queen-*stirrups*.

c. c. Corbeilles of oak to strengthen the ends of the Tie-beam where all the weight and action of the Truss are concentrated.

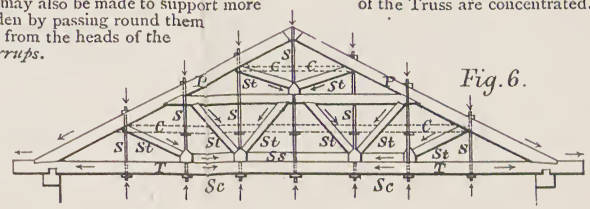


Fig. 6.

P. P. Principals. *T. T.* Tie-beam.

S. S. S. S. S. S. S. Suspenders of wrought-iron hung to the backs of the Principals, and holding up the Tie-beam.

St. St. St. St. St. St. St. St. Struts abutting upon the Suspenders, and directed exactly to those points of the Principals which receive the cross-strain of the Suspenders and the burthen which they have to carry.

C. C. Collar-beam.

cc. cc. Other Collar-beams which may be framed in short pieces between the Struts, but which will become loose by the shrinkage of the Struts, and will then require re-adjustment.

Ss. Straining-sill.

Sc.——*Sc.* Parts of the Tie-beam between which the timber may be scarfed.

Fig. 7.

London: Crosby Lockwood and Co., 7, Stationers' Hall Court, E.C.

feet of the principals being cast a long way within the walls, and thus bending the ends of the tie-beams, so as also to bend and crack the ceilings: the thinness of most modern walls and the lowness of the pitch of some modern roofs cause this defect to be the greater; and it is sometimes still further increased by a heavy pole-plate with the weight of the rafters and covering of the roof upon it, being set injudiciously *within* the walls upon the ends of the tie-beams. Even some roofs of modern churches have speedily required the correction of this defect.

If the rafters be set *horizontally* as small purlins upon the backs of the principals, the strain of the principals may be set in ordinary cases almost upon the walls, and thus save the ends of the tie-beams from the improper cross-strain.

It must always be remembered that when trusses are used a vast weight is concentrated upon each end of them: great care must therefore be taken to support well their ends; and if they be inserted in walls, the weight should be diffused over as large and as firm a surface as possible by strong plates or templets of stone, iron, or wood; but no truss of wood should be set upon supports of stone absorbent of moisture without the interposition of plates of lead, iron, or other metal, in order to prevent the wood from rotting.

Of abutments.

Much of the failure in modern edifices results from the defective nature of their abutments.

The abutment must always be *sufficient* to sustain the weight, thrust, or moving-power, which it has to resist; and it should be *more than sufficient;* otherwise the slightest accident, as additional weight irregularly disposed, yielding of foundation, sudden emergency or shock, will render it *insufficient.* Thus the limbs of two similar arches, meeting upon one pier, afford an abutment to each other of the most perfect kind: but if one of the abutments supporting the other limb of one of the arches be so weak as to cause one of the arches to give way, the other arch may also lose its exact equilibrium. Again, if one of the arches have upon its crown more weight than the other, the other arch also may be made to settle irregularly: hence it becomes necessary *that, besides unflinchingness of foundation, there must be abutment sufficient to resist all accident.*

The most perfect system of abutment is that which is in all respects equal: thus, for instance, the inclined sides of a hollow conical or pyramidal steeple afford abutment of bulk, inclination, certainty of material, and weight, equal to those of each opposite side; and the entire circuit of abutments gives to the whole perfect equilibrium, which nothing but violent accident or undue settlement at the foundation can in the slightest degree derange,

and even after such settlement has taken place, frequently no fracture is observable; hence a steeple, consisting of four or more open buttresses, at which the moderns shake their heads in fear and trembling, is a more safe and certain mode of construction than modern square towers, which, by the slightest settlement, have a tendency to fall apart, and overhang, and after that fall to premature decay, merely by the weight of their materials.

Thus the circular drum beneath the dome of Saint Paul's is conical, settlement tending to consolidate its whole circuit of counter-abutments, and its form adding great charm to the internal perspective of the building,—while the perpendicular drum under the cupola of the boasted Basilica of St. Peter at Rome, is split in many places down to its very base, by the gravity and outward thrust of the cupola above it.

Perhaps there can hardly be found in the world, a specimen of exact counter-abutment more beautiful than the twelve stone curved ribs (forming a skeleton dome), which rise in a circle from the columns to the upper work of Bow Church steeple, Cheapside. They may indeed afford a lesson in the art of constructing real domes, for they show with what safety ribs may be raised from piers which may support a roof of slabs of stone, which may be lapped over each other so as to prevent the penetration of rain, which will ruin any ordinary dome, the joints of which radiate to the centre of the curvature; and while the masonic stone-work of such a skeleton dome might settle considerably in each distinct rib, without showing any flaws like those in the dome of the Vatican, even the weight of the stone covering-slabs may be made to act in some sort as a counter-abutment to each rib.

The mid-eval architects seem, by nothing short of inspiration, to have obtained the most delicate acquaintance with *architectural dynamics;* a knowledge which taught them at once to unite in their abutments, strength with economy, use with beauty. This refined intelligence taught them to render every necessary part of their constructions such exquisite ornaments, that the ignorant modern looking at them, without knowing their use, fancies them to be merely ornamental.

They first began in their vaultings with reducing the lateral thrust of the work to the smallest limits, by cutting out all the otherwise more level and hazardous parts of the vaulting, so that what remained scarcely left its perpendicular bearing upon the walls: they next greatly reduced further the weight of the vaulting by forming it of small stone ribs, with a mere thin cuticle of lighter materials in short and narrow panels between the ribs; and whereas in our modern brick vaultings, the groin-points are weak by their bond, and are still weaker from the soft and inferior nature of the bricks of which they are composed (vulgarly termed "*cutters*," and wholly unfit for the purposes of any *good* work), and we know scarcely any thing of the *dynamics* of such a vault,

—the mid-eval builder put all the strength in the ribs, strutted his ribs across as he deemed necessary, and made every strut a beautiful feature, conducted the active force down those ribs as easily as water is conducted down a pipe, and then, instead of leaving the active force within each rib to expend itself in committing unknown and unrestrained damage to the walls of the fabric, he united their force in one point, so that he could deal with it as an active power well ascertained; then knowing by the laws of the resolution of forces the way in which the united thrust of the ribs would move, he counter-acted by the smallest possible quantity of materials set in the form of flying-buttresses, pinnacles, and wall-buttresses, that force which, unrestrained, might have endangered the walls. Thus, by making use only of a small quantity of materials, every particle of which was brought into active service, he was enabled to carve, ornament, and enrich every part of his fabric out of those funds which we ignorant moderns expend in raising coarse masses which perform no duty, or, ill-directed, either waste much of their weight and strength, or else employ it in rending and dilapidating the fabric.

The manner in which the Gothic architects conducted the active force of a vault to one place, and then with practical certainty counter-abutted that force by a small quantity of materials placed exactly in the situation proper for the purpose, has just been shown: it is now proposed to show the wonderful manner in which the *flying-buttresses*, the wall-buttresses from which they spring, and the surmounting pinnacles, are together disposed so as with the most delicate union of the extreme of beauty, to unite the most wonderful economy and such a knowledge of mechanics as will in vain be sought for in any other description of buildings.

Having found out exactly the precise place where the active force of the vaulting was pressing against the wall, they distended the *flying-buttress* or *arc-boutant* widely at that part, in the same manner as a modern carpenter, in *temporary shoring*, places a board flat against a dangerous wall; they then gradually concentrated this distention of the wall-thrust into one point, where the flying-buttress joins the wall-buttress: thus they concentrated at the head of the wall-buttress all the active force communicated by the vaulting, in the same manner as in wrestling, all the force received by the arms becomes concentrated in the spine, pressing its vertebræ closely together (see Plate VII., fig. 1): but then, as the operation of this force would have required the wall-buttress to be made sprawling out to a vast distance from the wall, in order to prevent the active power from throwing it over, they changed the course of the active force simply by running up the head of the wall-buttress in the form of a pinnacle, which having only a direct downward gravity, by the *resolution of forces*, so changed the course of the active force that it could be confined within the

body of a buttress of comparatively moderate dimensions,—the downwardly-increasing gravity of the wall-buttress in fact mingling with the force communicated to it, curved the direction of the force more and more inwards till it was eventually re-diffused horizontally over the broad foundation of the buttress and was from thence communicated to the earth itself. Thus pinnacles became the most refined instruments in the economy and security of ecclesiastical and other buildings, and, like the position of the human head, had a most materïal influence upon the stiffness and activity of the whole frame.

They did not always stop here, for knowing that there was a portion of the *wall-buttress* near the ground and adjoining to the side aisles, which received no thrust, and lay as it were dead, this they cut out altogether, as at Gloucester Cathedral, some of our English Chapter-houses, Westminster-hall, and some of the continental cathedrals which have chapels set between their *wall-buttresses;* so that, in fact, the whole form, position, and management of the counter-abutments of Gothic vaultings were like those of a human skeleton, placed in a leaning posture, with the bones of the legs away from the base, those of the hands and arms pressing against the moving part of the vault, with the skull erect to confirm and steady the spine, and the whole strengthened by sufficient flesh and muscle.

The true mechanical office of the pinnacles of pointed architecture (see Plate VII., fig. 2) requires that the double set of flying-buttresses on the south side of Westminster Abbey be respectively inclined so as to receive within their solid substance the pressure of the vaulting; and that on account of the operation of the two sets of pinnacles the lower flying-buttress be set more uprightly than the upper one. If the original builders were not fully versed in the subject (which may be greatly doubted), Wren, who restored these buttresses, was so, and probably by his great scientific knowledge was enabled to adjust more accurately their proper positions. The great masters who had to do with this fabric could not avoid the great extra consumption of materials which arose from removing the great buttresses away from the wall out in the cloister-green, in order to leave room for the north avenue of the cloister: but having a difficult task to perform they performed it with admirable skill, and with knowledge greater than is exhibited in many of the continental cathedrals, some of which have two sets of buttresses, in order to admit side chapels.

With what humility should we look upon our whole modern use of buttresses, pinnacles, and abutments, which we pretend are the results of a far outstripping science, and of an improved taste, —while men whom we have been in the habit of calling barbarians, have in a dark age (more enlightened in many things than the best ages of Greece and Rome) at once mingled in their works poetry, economy, taste, strength, and invention.

Of how small a portion of the materials constituting most modern edifices performs the intended duty; and how this defect renders our works not only broken, but denudes them of all proper adornments, by that expense which might have furnished them with such decorations as would have entered into, and have grown out of, their very structure, being wasted in merely adding an expensive burthen to the efficient parts of such edifices.

In a multitude of instances, where no competent professional man directs the construction, so little care is taken that the materials of edifices shall be sound, and shall be put together with such art that they shall all perform their duty, in either supporting or holding together the fabric, that take edifices generally, it is not improbable that less than the quantity of materials employed might have made them far more secure and free from flaw, leaving a great portion of the materials to be either saved or to be employed in solid and intrinsic adornments, which, like those of architecture, in all her ages of true glory and true economy, should live and die alone with the strength of the fabric.

Thus, if the degree of strength which is found in an ordinary dwelling-house, with its flaws, distortions, and sinkings, be deemed sufficient, and if a way can be discovered of producing the same degree of substantiality without the employment of so much material, no doubt great benefit will be done.

It is rare to find in a modern structure any brick-work which, what with the bond of it being broken by the disconnexion between the better work of hard grey-stock bricks and the softer, more perishable, and scarcely-tied facings of yellow bricks—the broken bricks in the interior of the work—the deteriorations caused by the workmen leaving in the work all those bricks which break under the operation of laying them, and which he never cements together after they are broken—what with holes and spaces left in the walls, bricks set closely only in the front and broken away at the back,—and then again, considering that in most of our structures piers are placed over apertures, and very frequently upon pretended arches of gauge-work, or the more worthless pretences for arches—this part of the work is not so secure as if it had been composed of only one tenth part as much material, but that of good quality and put together with watchful care. The author has seen modern structures of comparatively good materials, which, from being carried up in every part in defiance of every static principle, have of themselves gradually flawed, and in some cases pulverised nearly one half of their component bricks; while many of Wren's lofty church towers are almost without a flaw, although their interior work is evidently mainly composed of the ruins of the former buildings which were destroyed by the great fire of London.

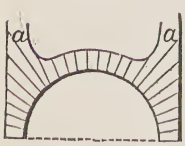
Of the excellence of Gothic arches.

A great deal has been written relative to the strength of different kinds of arches; but it seems that from the fall of pointed architecture, till very lately, we have lost sight of the principle that, *the thing which is* PRACTICALLY *the strongest and convenient is practically the* BEST.

These properties are possessed in an eminent degree by Gothic arches; for they will subsist firmly, of a construction much lighter and containing much less quantity of materials than any other kind; the most ignorant may learn this without acquiring scientific knowledge: all other arches require to be complete or they will almost entirely fall; but aspiring pointed arches, containing no materials which are really hanging in a state of jeopardy from downward pressure, have less tendency than any other kind of arches to thrust out their abutments and derange their haunches; for having no horizontal crowns to fall down, they are destitute of that outwardly wedging property, which causes the ruin of other arches, and that of the piers beneath them.

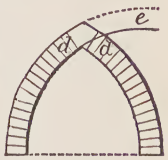
The stones composing the lofty ancient pointed arch, *even without cement, would scarcely slide from their places;* hence we see, that although violent destruction has come to an infinite number of the finest buildings in the pointed style, in numerous instances *the whole sides of their arches remain perfect even up to their very points, notwithstanding their other halves have been destroyed, and three centuries of rain, snow, frost, and storm, have preyed upon them,* while almost half the number of *our modern arches,* though possessing all their parts, *are a complication of fracture,* and need but some slight accident to remove a small portion from each of them, to cause them *to fall to utter ruin.*

It is a high praise of the strength of Gothic arches, that all the handsomest and most successful great modern domes, are nearly, if not quite, in the form of Gothic arches, merely with their points surmounted by spires or lanterns; in fact, they are a series of Gothic semi-arches, rising from a circle or other figure, and meeting together at their heads; the best domes of Europe and of Asia are all of this form.



Some of those who write upon the equilibrium of arches, assert that over each abutment (*a*) of a semi-circular arch a load of infinite altitude is required in order to counter-balance the key-stone and other parts of the arch, which, from their downward pressure are in jeopardy and tend to thrust away the abutments intended to confine them; but as such an altitude would be neither convenient nor possible, and as great weight added to the abutments would make them

sink into the earth, and thus ruin the arch, some have imagined that to omit the lower parts of the arch and to make it only a segment of a circle, with no part of the arch deeper than from *b* to *c*, is to omit that portion of it which it is neither convenient nor even possible to load sufficiently to resist the outwardly wedging property of the upper voussoirs. But however this subject may be involved in obscurity, and however little may from the want of actual experiments be known relative to it, yet it is certain that a very considerable portion of the whole weight of a circular segmental arch is thrusting away the abutments, whereas a high pointed arch, not having its voussoirs carried up beyond *d*, *d*, there are no materials at *e* in jeopardy, with a direct downward pressure, so that the Gothic architects, in omitting all the dangerous parts of an arch, showed a kindlier and more refined acquaintance with practical science than those who have written the most ingenious and abstruse theories upon the equilibrium of arches, and who instead of seeking to reduce the quantity of materials in jeopardy, have only sought to burthen, at an enormous expense of solid masonry, the extrados and piers of the arch in a manner which in cases of doubtful foundations might grind the whole work into the earth.



Mr. Ware, in discoursing upon the same subject, notices that Gautier says, "that pointed arches were used in bridges, churches, and other buildings, 'par la faire moins de poussée.'" Sir Christopher Wren makes a similar observation, adding, "that these arches require less centering and thinner stones."

How very nearly the builders of the edifices of pointed architecture removed all lateral thrusting power from their arches is still further proved by the frequent absence of flying-buttresses, as mentioned by Jean Rondelet, in his *Traite Theorique et Pratique de l'Art de Batir*, sixth edition, vol. iv. p. 293.

"Cette multitude d'Arcs-boutans, dont la plupart des églises "Gothiques sont garnies á l'éxterieur, sont souvent superflus, ainsi "que le prouvent, indépendemment de la théorie, plusieurs "édifices de ce genre, où l'on a evite d'en mettre, quoique leurs "voutes soient beaucoup plus éleveés que la plupart des grandes "nefs au-dessus des bas-cotes des eglises ordinaires, telles que la "Sainte-Chapelle a Paris, et la petite eglise de Cluni, pres la "Sorbonne, que nous avons deja citees, et plusieurs autres qui n'en "sont pas moins solides."

And again, the same author observes, "La courbure de cintre "la plus favorable pour les voûtes d'arête est celle des arcs "Gothiques, parce que la partie qui pousse le plus se trouve "supprimee. On trouve que l'effort de leur poussée n'est que les

" trois septiemes de celui des voutes en plien-cintre de même " diamètre, épaissure, hauteur de pied-droit et forme d'extrados, " et qu'il suffit de donner à leurs points d'appui les trois quarts de " ceux des voûtes en plein-cintre de même forme et dimension."—Vol. iv., p. 292.

There is yet another excellence which has been practised in the construction of Gothic arches, as mentioned by Dr. Moller, in his *Denkmäler der Deutschen Baukunst.*

"In regard to the buttresses or contreforts of the vaulting, " we find a method practised in the cathedral at Cologne, which, " although hitherto unnoticed, appears to be as judicious and " serviceable as it is simple.

"The lower part of the vaulting is formed by horizontal " courses of the stone-work projecting out from the wall, similarly " to the construction observed in the treasury of Atreus. Conse- " quently, the actual span of the vaulting, and its volume or bulk, " are proportionately decreased while, on the other hand, the " abutment is in the same degree strengthened. Still more " deserving of attention is the manner in which the essential parts " are so linked together as to be rendered incapable of thrusting " or giving way, and must therefore, of necessity, remain in the " precise position they were intended to be in."—*Translation by W. H. Leeds*, p. 153.

Now, an examination of the steeple of St. Dunstan's in the East, London, will show that Wren, either from studying the Gothic buildings, or by his own skill, was led to practise the same mode of construction as is to be observed in the vaulting of Cologne Cathedral; for the lower courses of the four flying-buttresses of St. Dunstan's steeple are laid horizontally and form indeed one with the courses of the masonry of the four pinnacles surmounting the angles of the tower of the church. (See Plate VII., fig. 3.)

Of the defects resulting from the use of Gothic arches, and of the remedy for those defects.

There is one defect which may by oversight subsist in an eminent degree; the property by which pointed arches may, by reason of their steepness, throw off from their extrados or backs the spandrils or materials which are frequently piled upon them. In a range of arches of equal size and strength, this is of no ill effect; for repose is preserved by the materials of the spandrils tending to slide equally from the backs of each pair of arches, and thence falling upon the pier beneath them: but against the end arches must be abutment sufficient to resist the moving power of the spandrils, or they will slide off, and the end arches becoming crippled, the adjoining arches also will be more or less deranged.

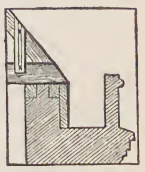
This is found in actual practice: a great portion of Gothic masonry, being cheap rubble-work, has a very great tendency to roll wherever there is a want of equilibrium; hence at the crossing of the nave choir and transepts of most Gothic cathedrals, there is more or less giving inwards of the four great central piers; and to counteract this failure, and to render those piers capable of bearing a stupendous tower or steeple, the most scientifically ingenious internal "*arc boutants*" have been inserted in some cathedrals, as those of Salisbury, Wells, and Canterbury. (See Plate VII., fig. 4.)

To prevent this bad effect, the spandrils over Gothic arches, and indeed over all arches, should be laid in courses of squared masonry or brick-work; and the backs of the arches should be formed in a series of horizontal gradations, so as to have no tendency to roll from off their seats the superincumbent masonry.

General observations relative to roofs and gutters.

As it is in vain that roofs are formed upon scientific principles, unless when they are so formed they will for a long period remain unimpaired by time and weather, one of the most important considerations in their structure is the guarding against premature decay: on this point, therefore, the author does not scruple to insert the very valuable observations of Dr. George Moller, which are to be found in his highly-esteemed work on Gothic architecture, at the description of the Minster of Freiburg in the Breisgau. They are as follow:—

"While we are making our observations upon this section, it "will not be irrelevant to notice, how in this as well as all similar "buildings, the water-channels of the roof and the parapets "are formed without there being any attic. The timbers, joists, "and wall-plate, which would be liable to be injured by damp and "wet, lie higher than the gutters; and the intervals between the "joists are not closed up externally, but left open to admit the "air, while the gutters themselves are for greater "security formed of hollowed stone, or of metal. "Evidently rational and laudable as these precau-"tions are, and greatly as they, undoubtedly, have "contributed to preserve the timbers of the roof in "a sound state during so many centuries, they are "almost entirely neglected and disregarded in our "times, when it is usual to form the gutters above the level of "the wall-plate, and to insert the timbers into the stone, so that "they soon become damp and require a long time to get dry "again. The mischievous consequence of all which is that con-"stant repairs are needed, and it frequently becomes necessary "entirely to renew the timber work of the roof.



"Nevertheless, we find the same perverse practice in all our "modern buildings of importance, and not only in Germany, but "in both France and England: and, moreover, taught in ele- "mentary works on building. Greatly however is it to be wished "for the interests of art, that it were henceforth banished, and the "wiser practice of our forefathers adopted once more."

After these important observations by the excellent German architect, it is scarcely requisite to add here anything relative to the situation of gutters, except that in general, gutters *over-hanging* the walls, save the timbers from rotting better than when they are placed *within* the walls, in which latter case, if there be any leakage, all the wet runs into the building, and damages it; but then there is a draw-back upon this method,—viz., that the gutters cannot, without a parapet, be readily examined and cleansed; but even this very defect has some advantage, since it frequently prevents incautious persons from ascending to the roof, and damaging the tiles or slates of it: and it must be observed, that it is very difficult in most of our slight English buildings, to place the gutters in the excellent manner stated by Moller, from the walls not being sufficiently thick.

Sometimes, to keep the two sides of a gutter parallel, we place a heavy timber pole-plate *off* the walls; this saves the waste of lead, at the highest parts of the gutter, where width is least wanted; but then there is the disadvantage in this mode of construction, of increasing the weight upon one point of the tie-beam; to prevent which from bending even at its very end, a corbeille of oak is obliged to be placed under it; and even in this case the end of the tie-beam will yield beneath the pressure of the pole-plate, so as to appear very unsightly within the building, and so as to cause the ceiling to crack.

With regard to the coverings of roofs, perhaps well-burnt plain tiles are the very best covering, if they are laid to a proper lap, and, when the pitch is low, laid in hair mortar.

Slating, from its cheapness, lightness, and excellent appearance, can hardly be discouraged, though frequently not so durable as could be wished; it requires, indeed, very great attention on the part of the professional man, if the work be not done by workmen upon whom he may depend, to prevent the fraud of the slates being fixed with iron nails instead of with nails of copper, zinc, or some other lasting material; for though small is the difference of expense between iron nails, which in two or three years corrode, and leave the slating loose and imperfect, and nails which will not corrode, yet this fraud is frequently practised.

Too much caution cannot be given to the architectural student, as well as to the employer, to avoid all pretended economical substitutes for lead, tiles, slates, and other coverings for roofs, whose excellence is well known: all such inventions have hitherto failed; and, besides the loss of their own cost, a renewal

of the timbers and other injured parts of the fabric has been the consequence. The roofs of the new Houses of Parliament might be instanced as a case where the injudicious use of galvanized iron instead of lead has been productive of great trouble and expense.

It should be the architect's study in all roofs to have as little as possible that will either burn or rot: if the roof-trusses were made of cast-iron, as Mr. Gwilt has made those to his restoration of the choir of Saint Saviour's Church, Southwark; and the new roof of Chartres Cathedral; and if slight horizontal rafters reaching from truss to truss supported tiles of the ornamental description above mentioned, all combustible materials might be banished from our invaluable cathedrals.

Now iron and copper are comparatively so cheap, it would be a laudable exchange, if the beautiful truss-work of Saint Paul's dome were reconstructed in cast-iron and copper, to prevent the disaster which the fire of some plumber or fanatic will some day bring upon the cone, lantern, cupolas, and vaultings of this building.

On the use and abuse of timber partitions.

The *proper* use of timber partitions is for separating the upper stories of buildings into more divisions than the lower parts of them, without impeding the lower apartments by props for the support of the upper divisions; and if made on true principles, they not only subsist without casting any weight upon the ceilings below them, but form the means whereby those ceilings may be more firmly upheld; for a quartered-partition, properly formed, contains truss-work as capable of upholding a floor, as the trusses of a scientific roof are of upholding a ceiling of prodigious weight and span.

Abuse in the use of quartered-partitions consists in the adoption of them where they reach the ground. In London, when properly constructed, they usually cost as much as walls of the best brick-work nine inches thick; and in the country, where stone is easily obtained, they frequently cost as much as walls of unhewn stone, eighteen inches or two feet thick. Sometimes we are almost compelled to use them in order to avoid loss of space in contracted sites; but this forms no excuse for the use of them in new buildings, in open situations where a few inches of ground are estimated at little value.

An absurd notion is abroad, that thin walls of brick-work are incapable of subsisting. For this there is no foundation: the defects of thin walls arise not from their thinness, but from their imperfect structure and materials. If several hundred feet in height of a steeple subsist for more than five hundred years, of masonry scarcely on an average thicker than a nine inch wall, the

non-subsistence of a low nine-inch wall cannot result from its want of thickness: six feet in length of nine-inch walling contains as much strength as three feet of eighteen-inch walling; and no one ever disputed that a pier of eighteen-inch brick-work, three feet wide, is capable of supporting very considerable weight.

The material of *good* brick-work, is harder, stronger, and more durable, than are the stones of most Gothic buildings; while the mortar with which they are put together, can rarely be compared with the best kinds of stone-lime with which tolerable modern walls are built; and the substance of modern bricks will stand fire an infinite deal better than most descriptions of stone. The great conical steeple which bears the lantern and all the external dome of St. Paul's has already subsisted far longer than most dwelling-houses of the best construction; and has still suffered no decay, although the cone itself is more than ninety feet high, and is only eighteen inches thick.

As if it were not bad enough to support the roof of an ordinary London house (if to support it may be called) upon a drooping gutter-plate of timber, that gutter-plate itself commonly rests but upon a stack of wretched mal-formed quartered-partitions which lie between the back-rooms and the front-rooms of the house, for which in most cases a wall of brick-work might be substituted, increasing the depth of the house only four or five inches. (See Plate VII., fig. 5.)

Of breast-summers in building; how abuse in the frequent use of them has increased in modern times; of their inconvenience; some thoughts and suggestions for preventing the evils resulting from the use of them; and some further suggestions for superseding on many occasions the use of them altogether.

Viewed as a principle of construction, the use of breast-summers is wholly inadmissable: for the super-incumbent weight upheld by them, acts upon them by direct cross-strain, a test to which no materials whatever should be put in a building formed upon a correct principle of construction.

It has been stated, that from the shrinkage of the wood, the brick-work over a breast-summer usually cracks, falls, and becomes disjointed. But it must be admitted that sometimes though this be the case, a timber breast-summer is not itself defective further than happens from its shrinkage and yielding; for its fibrous nature imparts to it such toughness, that it will rarely break: but the inconvenience of leading to the disruption and distortion of the super-incumbent wall is sufficient cause for its rejection.

Besides the shrinkage and deflexure of wood breast-summers,

their liability to rot and to burn must be added; and if they be made of iron, though they will not shrink or rot, yet when fire happens, they may be (though said to be fire-proof) still more disastrous and less certain than those which are of wood. Breast-summers of stone could hardly under any circumstances be relied upon.

The author has used for the reception of walls which could only admit supports at their ends, a kind of breast-summers (or rather arches) composed of brick-work, with stone abutments, and the whole contained within two long hoops of wrought-iron: and this has proved successful; for provided the hoops be completely welded together, and be sufficiently strong, and the arch be bonded so closely as to admit of no settlement, neither expansion nor sinking to any sensible degree can take place: this trial proving successful, he has since employed the same means in an old building; whereby much of the trouble, expense, and inconvenience of shoring, were saved. In adopting this method in old buildings, success will depend upon the care an address with which the work is performed. (See Plate VII., figs. 6 & 7.)

The author also suggests the following method, which he believes may with good success be adopted upon many occasions, both in new and in old buildings; this is by supporting all the chief super-incumbent weight by a strong arch of brick-work or of masonry, semi-circular or Gothic, as the case may require (but the latter always if the work is to be covered with stucco, and is in old buildings): in this as in the last described method, shoring is nearly if not entirely superseded; and if address and care be used, no fracture will occur. The mode to be adopted, is first to fix the story-posts of iron; then to proceed to mark out the great arch, which may be inserted bit by bit (without endangering the fabric) till the whole is complete*. The tie across may be made very light, according to circumstances, and sometimes so as merely to be sufficient to hold the story-posts from being driven apart; and in lieu of a breast-summer, may be inserted one or several such assemblages of work as are before described.

Of the faulty method of covering over the external apertures of edifices and of the destruction of property to which this fault leads.

Another cause of the vast inferiority of private edifices, is the modern method of covering over their external apertures. A

* It is a common practise in Italy to mark out on a wall the lined form of an arch intended to be inserted; to cut the old work out gradually, and bit by bit, as gradually, to insert the new arch, and thus save the expense of shoring or needling. —[Ed.]

multitude of structures are literally dropping to pieces from fractures in the arches or other coverings of their external openings; whether built by common bricklayers, or by masons, or by surveyors, by jobbing speculators, or by wealthy bankers, little difference is to be found. An incredible number of our edifices are in this condition; nor indeed is the difference very great, where pier is erected over pier, and window over window.

But perhaps the most scandalous instance of modern ignorance or culpable imprudence, is the covering over of the apertures of structures, otherwise good, with an arrangement of bricks, possessing none of the properties of an arch. Some call the brick-work so placed a French arch: the author is not acquainted with any name for it; and were he disposed to give it one, it might be *no-arch* or *flaw-wall.*

Almost all our new buildings, which are intended to have their sins hidden by external plaster, are endowed with this kind of mal-formation; even over Venetian windows eight or ten feet wide the same silly freak is repeated; sometimes these pieces of brick-work are set in cement, but are even then little better. The truth is, they are un-geometrically absurd; they depend upon nothing but the tenacity of the cement, or the violent friction of the bricks one against another; even if they otherwise escape fracture, the slightest settlement at the foundation is sufficient to destroy the whole of them in a building.

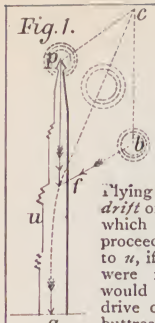
In the construction of arches, the author brings together a few of the modes followed in times past, the meanest of which evinces the earnest desire to provide sound construction, whatever the cost might be.

The first example here given (Plate VIII., fig. 1) is from a Roman sepulchre upon the Appian Way, and exhibits not only arch-stones of a proper wedge shape, but with a curious invention, the result of great care and skill, by which one course of the vaulting is prevented from sliding upon another: it much resembles the joggle-joints made use of in the pendent parts of a modern stone architrave.

The second example is taken from the abutments of an arch over the doorway of another Roman sepulchre, also upon the Appian Way, and exhibits great care and skill. (Plate VIII., fig. 2.)

The third example (probably of later date), is perhaps the earliest existing instance of a curious but excellent mode of preventing the voussoirs of level stone architraves or lintels from settling downwardly (Plate VIII., fig. 3), which became prevalent in various parts of Europe during the middle ages: it is from Diocletian's palace at Spalatro, in Dalmatia, which has so often been referred to as exhibiting some germs of the peculiar ornaments which afterwards became prevalent in the Romanesque,

Fig. 1.



f—b. Bent of the Force communicated to the Flying buttress by the *drift* of the Vaulting, which force would proceed unrestrained to *u*, if the Pinnacle were removed, and would consequently drive over the wall-buttress in that direction.

p—f. The direct downward force of the gravity of the Pinnacle.

c—f. The active direction of the two combined forces above-stated, more and more restrained in its downward course, within the body of the wall-buttress, till it reaches the ground at *g*.

f, b, p, c. Parallelogram of Forces.

Fig. 2.

F—B. Bent of the Force communicated to the 1st Flying Buttresses.

F. B. P. C. Parallelogram of Forces.

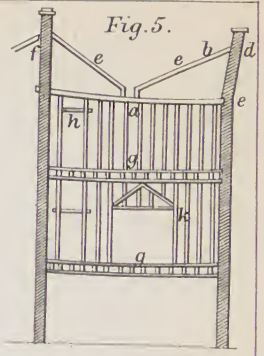
C—F. Direction of the combined Forces.

f—b. Bent of the Force communicated from the 1st to the 2nd Flying buttress.

p—f. The direct downward force of the gravity of the 2nd Pinnacle.

c—f. The active direction of the combined Forces after leaving the 2nd Buttress, and more and more inflected till it reaches the ground at *g*.

Fig. 5.



a. Gutter-plates.

e.e. Rafters forcing in the Gutter-plates.

g.g. Floors sunk by the settlement of the Quartered-partitions, and the Stress of the Roof.

h. Door-head forced out of level by the racking of the Quartered-partition.

k. Door-posts driven out of perpendicular by the cross-strain upon them of the Struts above the doorway.

Fig. 3.

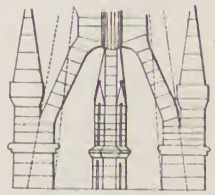
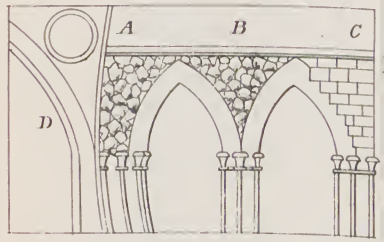


Fig. 4.



A. Rubble-work rolling off back of a Gothic arch.

B. Rubble-work retained in repose between two Gothic arches.

C. Spandril graduated in regular courses upon the back of a Gothic arch.

D. Internal arch-buttresses.

Fig. 6.

1, 2, 3, 4, 5, 6, &c. The order in which the old brick-work is to be gradually removed and to be replaced by a well-bonded arch of brick-work set in Parker's cement.

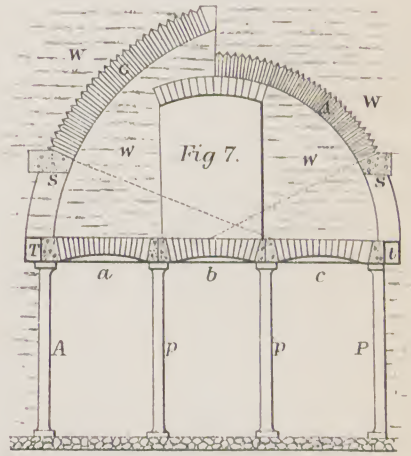
V., &c. Vacancy which may be eventually left between the hoops and the cradle-bars.

The old work between the story-posts is not to be removed till after all the other processes are complete.

If this mode be adopted in new work, much of the trouble and caution will be unnecessary.

The two hoops should be pitched over to prevent corrosion; and some cross ties may be used in order to prevent the two hoops from moving further apart.

Fig. 7.



A. P. Story-posts of iron to be first inserted.

S.s. Skew-backs of stone to be in succession inserted.

A. Arch which is to be formed piecemeal, only a small part of the old work being removed at once.

G. Gothic arch, which may on some occasions be preferred to the one last described.

W. w. &c. The old wall upon which the arch is to be first marked out, and into which the arch is to be afterwards set.

p. p. Minor story-posts of iron, which may be afterwards inserted if required.

a, b, c. Arched work instead of a breast-summer.

T. t. Wrought-iron tie, to prevent the arch and the story-posts from expanding.

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Norman, or Byzantine style of architecture; and the gradual western spread of this same method, till it at length reached England, seems almost to furnish another argument for the Oriental origin of some particular parts at least of Gothic architecture.

The fourth example (Plate VIII., fig. 4) is taken from the lower story of the reputed tomb of Theodoric, at Ravenna, and exhibits a semi-circular arch with its voussoirs joggled or refracted as those of the third example.

The fifth example (Plate VIII., fig. 5) is taken from the upper part of the reputed tomb of Theodoric, at Ravenna, and is similar to the third example, but displays double precaution.

The sixth example (Plate VIII., fig. 6) is taken from the Transom of the Norman work of the western doorway of Rochester Cathedral.

The seventh example (Plate VIII., fig. 7) is from the mantle of a fire-place in Edlingham Castle, Northumberland.

The eighth example (Plate VIII., fig. 8) is from the mantle of a fire-place in Conisborough Castle, Kent, and is exactly similar to that at Diocletian's palace shown in the third example.

The ninth example (Plate VIII., fig. 9) from the gate of the Alhambra is copied from the magnificent Spanish work published at Madrid, A.D. 1804, entitled *Antiguedades Arabes de Espagna.*" There is even below this arch another of the Moresco horse-shoe shape: and Mr. Murphy gives two instances of the same kind of construction in the first plate of his superb work on the Church of Batalah.

The tenth and eleventh examples (Plate VIII., figs. 10 & 11) are from the fifth chapter of the fourth book of Sebastian Serlio's *Opere d' Architettura*, and are both very excellent: the following is their author's description of them:—

" Et perche la maggior parte de' supercilij, o architraui che " dir uogliamo, che sono posti sopra alcune porte, ouero botteghe, " per la larghezza dell' apetura, se la pietra non è di buonissima " grossezza non puo resistere al peso, and per questo in processo di " tempo si uiene a rompere, si come in moltissimi luoghi si puo " uedere; si potrà per gran distantia che si sia, pur che le spalle " dalle bande siano forti, far tal cosa di pezzi, nel modo qui disotto " in due modi designato, che indubitamente tal opera sarà for- " tissima:" but experience will withhold the reader from following Serlio's further observation: " & quanto il carico disopra sarà piu " grande l' opera andera a maggior perpetuita."

The twelfth example (Plate VIII., fig. 12) is taken from Mylne's work of Blackfriars' Bridge, London, and exhibits an excellent and economical piece of construction more applicable to ordinary cases than any of the preceding examples: in this example the joggles consist each of a cubic foot of hard stone. In small works copper plugs would be more proper, from requiring the

removal of less of the substance of the arch-stones, in order to admit the joggles.

It is hardly necessary to observe that whatever ingenuity is displayed by each of the above examples, the Gothic architects made still greater advances in the science of constructing arches, for their pointed arches, as has been already observed, were formed without any of their parts being in jeopardy, and that they therefore needed no other means for preventing their voussoirs slipping from each other; whereas the modern pseudo-arches have none of their parts which are out of jeopardy. Another excellence of the pointed arches is, that they may be formed well of such small stones as to be scarcely either curved or wedged in form; and it is probable that the workman, by narrowly observing the natural inaccuracy and oblique angles of the blocks of stone as roughly quarried, was enabled to shape them to his purpose without any waste whatever; whereas whoever knows anything of modern masonry, is well aware of the enormous consumption both of material and labour necessary for the production of the stones of a modern arch, or of even a piece of plain square masonry.

There is yet another method of forming arches (Plate VIII., fig. 13) which is indeed still practised in masonry: it consists in joining by an elbow to each voussoir a portion of the neighbouring horizontal course of the work. At first sight this method appears to be more excellent than any other: but observation upon its practical effect will tend considerably to lower that high estimate: as the angle of the elbow will not yield, irregular settlement will cause the horizontal parts to fracture from the radial parts of the voussoirs; specimens of this mode of fracture are to be seen at the "London Institution," Moorfields, which stands on a foundation so swampy that its side colonades and portals have settled away from the main building, although they have been once rebuilt on the same account. In the northern gate of St. Bartholomew's Hospital, London, there are examples of the same kind of fracture; and even at the side of the north portal of St. Paul's Cathedral there are in the small apertures which light the crypt, some specimens of similar rupture: in the last case the arches have above them an altitude of one hundred feet of solid masonry, and a quick-sand below them. It must be confessed that the rustic channels of arches wrought in this form have a beautiful effect.

First, then, Buckingham Palace contains many broken window-heads, both in the original building, and in the subsequent additions to it: secondly, St. Bartholomew's Hospital, London, possesses only about fifty of them, while a plastered Metropolitan Hospital erected only a few years ago contains more than fourscore of them: thirdly, of the twenty-four doorways and lower windows of the new church at Bryanston Square, London, eighteen of them have their stone architrave-lintels broken: fourthly, of the ten lower windows of St. Mark's Church, at Clerkenwell, not one

of their heads has escaped fracture: fifthly, of sixty windows of the new buildings in the Middle Temple, London, fifteen are broken: and sixthly, of seventy-one stone windows-heads to the new Westminster Hospital sixty-one are fractured.*

The author has had the flat external arches of various brick buildings, erected under his direction, prevented from fracturing or dropping by means of cradle-bars of wrought-iron (Plate VIII., fig. 14) placed invisibly below the arch-soffits, especially where he has suspected any uncertainty of foundation: and in all the buildings in which he has made the application not the slightest symptom of defect has occurred: emboldened by this success, he feels greatly disposed to follow the same method in all brick buildings whatsoever. The universal fracturing of modern buildings is certainly an unadulterated disgrace to us as a profession.

Gauged arches (Plate VIII., fig. 15), that is, arches of cut and rubbed bricks, are, of all things used in building, the least capable of duration and of the resistance of fracture: made of the softest, and therefore of the worst possible bricks, the soffit or under side of the arch being usually only four inches thick, the bricks carelessly jarred away except in front, and the joints not half filled with mortar, and that mortar of no durable quality, they hardly bear their own weight: they should upon every possible occasion be discarded. But not so those arches which are used in the counties where the best white bricks are made: they are as excellent and commendable in every respect as those of London are bad and absurd: *the arches alluded to are composed of very long, hard, and fine white bricks, burnt of a wedge-shape;* these are not shattered by the process of cutting, and require little besides grinding to a perfect surface; they do not lose their hard outward crust for a porous texture; while from their considerable length and wedge-like upward increase, they never from any ordinary circumstance slip or fracture; and in colour, and perfection of surface and joint, they almost resemble the finest marble, while they are in this climate more durable than marble. Surely, if the same method were universally adopted less first cost would be incurred than by the use of the present pieces of mutilated brickwork misnamed gauged *arches.*

On certain abuses in the formation of entablatures.

While in these latter times of great architectural knowledge, but of small architectural practise, one man with an over-weening, self-complacent, busy-idleness, attempts to prove that Vitruvius

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* No modern instances are given; all these mentioned here are examples existing twenty-five years ago.—Ed.

was an imposter; and another, with equal certainty, proves that Vitruvius never existed, and was therefore no imposter; while some who have given themselves superior light, prove that Palladio was a corrupter of his art, and that Inigo Jones was but a fortunate quack who rose only because he had no competitors; while such, with a share of egotism more than ordinary among the scientific of mankind, assert a superiority of skill and of practice, though rot and flaw show the claim to practical superiority, at least, to be groundless; nothing could more forcibly prove inferiority in taste as well as practice, than the abuses which have so spread in modern English architecture in the management of entablatures. He who despises what Vitruvius says upon many subjects proves, by his works, that he holds in equal contempt all the best works of antiquity.

Different strange fantasies have come into the heads of some practitioners with regard to the continuation or the discontinuation of entablatures. These are both almost equally practically evil.

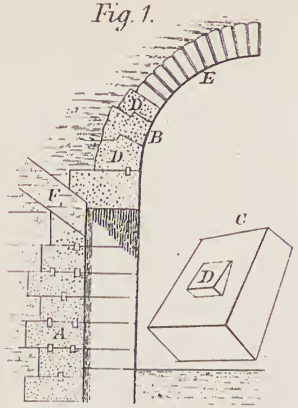
If some be still so perverse as to attempt to erect *Grecian* structures when columns are placed at undue distances, the architraves above them will sink, so that the blocks of the architrave in sinking, open at their soffits; and the fulcrums then formed by the inner angles of the abacus of each capital will by the descent of the architrave be thrust apart, and the columns, if of one piece each, will be moved over from their very bases; and if of several blocks, will be thrust over gradually more and more upwardly as gravity becomes less and less. Perpendicular jambs under an arch invariably appear wider apart at their junction with the arch, than at their bases, even before that almost constant settlement which drives them apart; and they in fact require to be set something together at their heads, in order to counteract that optical illusion.

Mr. Hope, in his essay upon architecture, was wrong in condemning the Roman triumphal arches for the disposition of their columns and entablatures; they were very different, it is true, from temples, but not less proper in their way; good construction required their entablatures to be managed as they were: and the works of all nations and of almost all ages down to our times, show that the ancients and our forefathers were rather more displeased, if possible, with bad construction than with bad taste: very few of our works raised since the middle of the eighteenth century would escape censure on both those grounds.

Of architectural drawing; and how neglecting other branches of knowledge neither makes a good artist nor a good architect.

There is no small boasting at the present day of architectural drawing. An architect cannot draw too well; but when he obtains much practice, he will find, that besides designing the form and

Fig. 1.

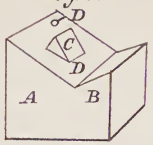


B. Lower part of the Vaulting, formed of three courses of Travertine Stone Voussoirs, joggled together.

C. View of one of the Stone Voussoirs, drawn to a larger scale.

D. D. Joggles in the form of Wedges, rising from the upper side of one Voussoir into the under side of the Voussoir immediately above it, so as to prevent one arch-stone from sliding upon another.

Fig. 2.



A. Skew-back.
B. Counter-abutment.
C. Wedge-shaped Joggle.
D. D. Plugs.

Fig. 12.

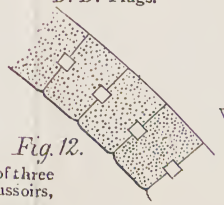


Fig. 4.

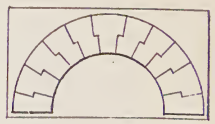


Fig. 3.

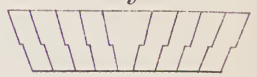


Fig. 5.

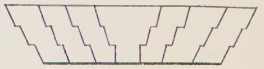


Fig. 6.

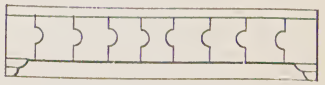
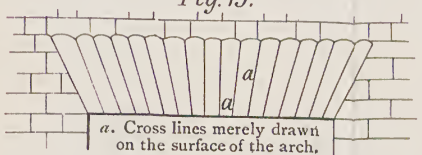


Fig. 15.



a. Cross lines merely drawn on the surface of the arch.

Fig. 7.

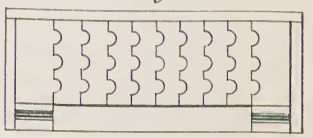


Fig. 10.

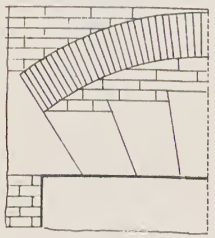


Fig. 13.

Fig. 8.

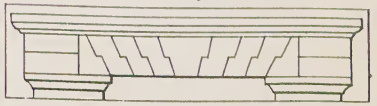


Fig. 14.

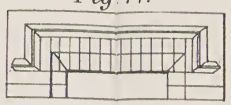


Fig. 9.

Fig. 11.

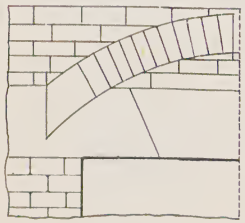


Fig. 16.

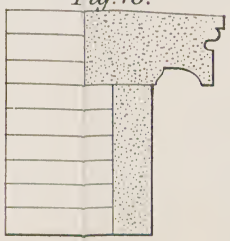
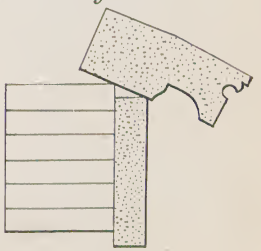


Fig. 17.



London: Crosby Lockwood and Co., 7, Stationers' Hall Court, E.C.

the details of his works, he has little time for drawing; in general, he has as little time for making the clean and fair copies of his drawings as the sculptor has for the stone-cutting department of his art: while if he cannot design, and is unacquainted with the other many branches of knowledge which he should possess, he should cease to call himself an architect.

In making drawing his sole study, (but with the interruptions which business will naturally bring) the pupil becomes only a bad artist, and no architect at all. The pernicious folly of imagining that he who can make an architectural drawing must of necessity be able to make an architectural building has wrought largely towards the ruin of real architecture, and has tended more than any thing else to fill our metropolis and other places with white-washed, and even stone ruins, which the weak have mistaken for architecture, and has led to that general disregard to structural propriety which is the besetting sin of modern works.

The pernicious sentiments which place so high a value upon design, and so low a value upon execution, are not confined to England; Antoine Rondelet in his *Essai Historique sur le Pont de Rialto*, says, "Les projets seuls procurent souvent les plus "beaux titres de gloire, et l'exécution ajoute peu à l'honneur de "celui qui a obtenu la préférence" (p. iii). Notwithstanding this, had Palladio built nothing, and had Jones not erected the banqueting house, they would have been little heard of. But in truth the mere drawing does not form the design; ingenuity and invention may be called for in a thousand ways in order to create a building, and yet the mere draughtsmen may be destitute of them both.

All the materials used in a building should form part of its structural strength.

It is a rule *in buildings of creditable rank*, which perhaps admits of no exception, that every piece of material which is added to an edifice should not merely increase the ponderousness of the general mass, but should be so artfully and intimately connected with the other material of the fabric as to form an integral part of its substance.

The lath and plaster ceiling of a modern fabric is so much mere addition to the weight hanging upon its beams or joists; the stone vaulting of a Gothic cathedral, by the scientific management of its flying-buttresses and pinnacles, presses together the layers of the wall-buttresses and confines them in their places. Again, if there be any bands or projections on a modern plaster ceiling, so much mere additional weight is hung to the woodwork; but the stone ribs of Gothic vaulting, instead of being weighty additions, form the nerve and strength of the vaulting itself, while

the intermediate mere panel-work, divided into only small sections, extremely thin, vaulted to keep up the principle of compression throughout all its parts, but lying in rebates between the stone ribs, stiffens them in the same manner as glass stiffens the bars of a sky-light. A chandelier of great weight, or any other heavy burthen, hung to a flat plastered ceiling, will tend to bend in and draw down the timbers and plastering, and will sometimes break them; such a pendant weight hung to the ribs of Gothic vaulting will press together more firmly the voussoirs of the vaulting and flying buttresses, and glue them as it were together; and if the work be truly constructed it will not fail till weight enough is added to crumble the stone by compression.*

A statue, or other heavy mass, erected over an intercolumniation or square opening, tends to break the entablature or the lintel above which it is set: a pinnacle, or a statue, surmounting the wall-buttress of a Gothic church, increases the resisting mass, and by its peculiar situation stops suddenly, and, as it were, reins in the drift of the vaulting.

These things are exquisitely beautiful; but, like flowers and fruits, they are far more useful and economical than beautiful. The pinnacles and flying-buttresses of modern structures in general perform no beneficial office; and though merely intended to be ornamental, they are rarely fine in shape and outline; their whole materials form expensive luxuries; in the ancient examples of them the carving is the only sacrifice for beauty, and what a sacrifice! there is not a clown who does not feel their elegance.

In St. Alban's Abbey and York Minster, whose naves have not been vaulted with stone, the flying-buttresses remain unbuilt to this day.

The modern imitator of Gothic architecture, frequently merely from caprice, places diagonal buttresses at the angles of his buildings, which angles are already stronger than the other parts of them, and these formed of brick-work, from the breach of the bond in setting the bricks angle-wise, sometimes crack wholly away from the body of the work, upon which they have perhaps for some time hung as a burthen: the object of our forefathers in setting buttresses angle-wise was to resist boldly and at once the diagonal expansion of the diagonal ribs of the last severy of the vaulting: two buttresses (of sufficient united power) set square near the meeting-angle of the two walls would perform the same duty, but less simply and economically.

Most of the decorations of modern steeples are merely intended to be ornamental, yet they but rarely fill out gracefully the outlines of such structures to pyramidal forms; the ornamental bands which

* If any particular severy of the vaulting be intended to be weighted in the manner here stated, care must be taken that the pinnacles and buttresses be duly proportioned to the weight to be resisted. In proportion as energy is added to a flying-buttress, weight must be added to the pinnacle, in order to diverge that energy within the wall-buttress, or the wall-buttress will be thrust over.

girdle Gothic spires, form a series of ties which unite at convenient intervals the stiff angle-ribs of the work; the pinnacles which surround the base of a spire with such witchery of effect not only fill out in the most graceful manner the outline of the structure to a pyramidal form—while they give it intricacy and richness of detail—but scientifically, they afford checks to the thrusting power which the base of the spire might otherwise exercise against the angles of the upper part of the tower. In the same manner the flying-buttresses which frequently rise from behind the angle-pinnacles of a square tower to some distance up the angle-ribs of an octagonal spire, resist all outward spread of the base of the spire. Some modern Gothic towers are made with flying-buttresses attached to only one side of them: these perform no office, and are merely showy excrescences, and intrinsically are as ugly as useless; they cost something, and add to the dronish part of the materials, although perhaps made so flimsy as to appear at a distance like mere wires.

We even find modern instances of church steeples, in which their flying-buttresses are made to pitch against and to overthrow the *upper parts* of the angle-pinnacles of the square towers from which they rise, instead of the energy exercised by the bases of the spires against the summits of the towers being communicated to the *bases* of the pinnacles, and thence diverged by the pinnacles perpendicularly down the main-angle buttresses of such towers. For flying-buttresses we also, in the like situations, see used instead of *semi*-arches, whole arches, which by the least stress collapse, and are thence useless. And further, sometimes in a case where an unnecessary exuberance has fallen into a steeple of paltry materials, by raising a second series of flying-buttresses, we observe those very buttresses, though themselves of proper form, pitched against the slight panel-work of the sides of the spire, instead of *two* flying-buttresses rising from each angle of the square tower, so as for each of the eight angle-ribs of the spire to be restrained by a buttress, and thus for the stress of the eight spire-ribs to be condensed *perpendicularly* within the four strong angles of the square tower itself. These several abuses are as unpicturesque as they are unmechanical, as inartistic as unscientific, as barbarous as ruinous, as expensive as they are destructive.

In modern buildings which have no pretensions to the geometrical structure of the freemasons, perhaps the worst instance of a large portion of the materials (and those the most costly) performing merely a dronish and parasitical part, is the mode of making the external facings and decorations hang as a burthen upon the other parts of a wall.

It has already been shown how modern brick-work fails in this respect: indeed, there are not wanting specimens of 120 years old of brick-work faced with *gauged work*, which, from the reduced *height* of the cut-facing-bricks, could only be tied in at large inter-

vals, where the horizontal courses of the front work and back work happen to correspond in altitude; in these, by the gradual crushing of the materials, the external work separated from the internal work and bulged outwardly.

But the modern system of facing walls with stone is still worse; in many works there is not the semblance of tie or bond from top to bottom, except the *iron* cramps with which the thin ashlaring is attached to the brick-work, and which cramps frequently rust and flush off the front of the stone-work. This is a most crazy description of building, and should be banished as worthless and contemptible from a city and a nation of unbounded wealth, and possessing more science and philosophy than were enjoyed by any other city and by any other nation in any other age, and that, too, which produced the finest specimen of architecture.

Cornices which project from ashlaring (Plate VIII., fig. 16) so ill connected with the walls themselves, are rarely safe; for you may be sure that economy has not allowed stone to extend upon the wall, much beyond a mere counter-balance to the part of the cornice which overhangs; in fact, the centre of gravity of the cornice-stones is rarely seated more than an inch or two behind the outer face of the ashlaring, so that if the ashlaring, which bears indeed the chief burthen of the cornice, bulge and sink, the cornice will follow it.

If the block out of which a stone cornice is chiselled will only just balance upon the wall (Plate VIII., fig. 17) before it is wrought, every atom detached by moulding it removes its centre of gravity farther within the wall. But we see at the present day cornices composed of cement, and Yorkshire paving-stone; at first, the stone is projected so far as to need shores for its support till the cement in which it is embedded is set; the weight of the projecting part is then frequently tripled by the addition of cement mouldings, so that were you to walk over such a cornice, you might either over-balance the whole or cause it to snap off; three inches of paving-stone being frequently the only substance upon which a cornice two feet high depends.

All the masonry which Wren applied to his buildings appears to be well bonded into the brick-work; and though many of his best church-towers are evidently composed internally of the ruins of preceding buildings, yet by judicious bonding, by rendering the work wholly geometrical, and by reducing all the gravitation to the simple compression of the materials, his buildings are in general more sound than modern works, the walls of which are composed of better materials.

It thus appears that in good architecture there is such an economy of materials made use of, that no parts of them are merely ornamental, and scarcely any ornament is not structural.

The neglect of the study of dynamics a principal cause of the instability of modern edifices and of the waste of materials.

In architecture we possess but the most indistinct knowledge of the chemical action of materials upon each other, and of their various degrees of oxidation; but we amply make up by rashness for want of experience in chemistry; while there are not wanting crowds of new cements and roof-coverings, and of metals in states of oxidation, destitute alike of good aspect and of durability, for which we are ever ready to leave oak, bronze, lime-stone, granite, terra-cotta, and those other few but almost universal materials, which our forefathers and their predecessors of high antiquity, gifted with but the slenderest knowledge of chemistry, by an honest discernment chose as the most proper for architecture; and that their choice in general was wise is attested by the fact of so many ancient works having survived thousands of years, while so many of our own decompose and pass away before ourselves, short-lived as we are.

One of the greatest boons that could be bestowed upon us, as a profession, or indeed upon mankind at large, would be a work upon *Architectural Chemistry;* there are not wanting highly-gifted proficients in chemistry, who by a due consideration of the wants, integrity, and beauty of genuine architecture, might furnish us with a complete developement of the nature, constituents, affinities, decomposition, oxidation, and other properties of the minerals and other natural productions which are, or ought to be, used in architecture, or which should be excluded from it.

The chemist could tell us what materials should approximate, what cements should be used for them, whether iron should be joined by acid as we see in works of engineering; he could tell us at once what materials are solidified or are decomposed by the atmosphere, or by water, or by fire; we might then see at once whether the multitude of patent inventions, on behalf of which we are perpetually importuned, are beneficial inventions, or are mere enthusiastic failures, or trade frauds.

The chemist might afford us tests, whereby the integrity of metals, paint, varnish, and of many other materials could be readily ascertained, and thus prevent the commission of frauds: and delicate as may be the search, perhaps some enlightened natural philosopher, by infusion, microscopic examination, or other treatment, could enable us to prove the nature or the authenticity of timber, relative to which so much deception may be practised, notwithstanding the ease with which, it is pretended, fraud can be detected.

Of the little knowledge which we possess with regard to chimneys, and how experiment and inquiry on an extensive scale are nationally required, both for health, economy, and the cleanliness and beauty of buildings.

In a country which is frequently moist and cold, and whose inhabitants by the progress of civilization have become chiefly an in-door population, the hearth and the domestic chimney must be of the very first importance: we are all as much entitled to comfort in this respect and to health, as we are to life itself: and yet, so small is the improvement in the management of fire-places which has been made during the last two hundred years, though during that time, from diffusion of literature and the peaceful nature of our country, we have become a complete fire-side nation, that it may be doubted whether any substantial benefit has been effected in the health and comfort afforded by our chimneys:—and even though our apartments may be warmer, it may be doubted whether they are not much more smoky.

New inventions for the forms and management of stoves succeed each other with rapidity; but soot and head-ache seem as prevalent as ever.

Very little appears to be known with regard to the proper formation of flues, except that they mostly require to be of considerable length, especially if seated in low places; and though this discovery was made in an early stage of pointed architecture, in which we can frequently find not only the best, but the handsomest chimneys; yet in assumed imitations of classical architecture, by notions founded altogether upon absurdity, the height of the chimney is depressed, and the future ugliness of building is insured by all manner of uncouth extraneous additions of earthenware, zinc, and other materials.

All that expense which is frequently so absurdly, and with such ill-success, expended in the concealment of chimney-shafts, should be rather used in ornamenting, and in rendering agreeable, members so necessary to the comfort of domestic buildings. Instead of chimneys being considered as eye-sores, the appearance of a dwelling-house without them should rather be considered ridiculous: that they may be made both agreeable and ornamental is proved by the examples of them to be found in pointed architecture.

Architects not scientific men, and scientific men not architects; the reason why architectural science and scientific architecture degenerate.

Mathematics forming in general no part of architectural study, none of these sciences are usually infused into architecture; while

the mathematician having no knowledge of the construction, details, uses, and embellishments of architecture, writes in general profitlessly for the architect; he cannot apply his knowledge to the construction of buildings, for he has no practical knowledge of it; while his algebraical theorems, which might be of use to thousands in building, being in a language unknown to them, form as it were a sealed book. The natural philosopher, in applying his knowledge to architecture, forgets that it is one of the fixed laws of nature to clothe its deep science in external beauty.

This was not so formerly; nothing was more advanced in science than architecture: now the architect is outraged at the uncouthness produced by the man of science, when he dabbles in architecture, while the man of science views with contempt the broken and irrational nature of modern architecture. The architect turns from an acoustic den with the same contempt as would an ancient baron,—while the natural philosopher despises servile irrational imitations of former architecture, which keep not pace with the advanced state of science.

Of the resources still left to the English architect.

Chemistry is still open to us, it can tell us what materials are fit for particular purposes, what are durable, what are incorruptible. We have no architectural chemists, and our buildings are destroyed by the atmosphere almost as fast as they rise.

Geology is still open to us; we have no architectural geologists to direct us in the search of lasting and honourable architectural materials.

Mechanics is still open to us, that mighty science which has made England a conqueror with her manufactures as she has been with her fleets and her armies: while the wonderful machines of modern England have facilitated, cheapened, and at the same time rendered more exact and perfect almost every chattel of use or elegance, and every article of attire,—yet has architecture scarcely received from mechanics during this age of outstripping science any one machine for facilitating, improving, or rendering more exact the operations of building; in the adaptations of the parts of a modern building a knowledge of mechanics, in its present wonderful state of advancement, ought to do something astonishing, whereas we have not a single building erected in England since the eighteenth century which exhibits the least approach to the exquisite ingenuity exhibited in the union of outward beauty and innate science by the edifices erected in an age deemed barbarous.

Geometry, that art without which architecture is childish and barbarous, is open in its full range; that art which, like electricity, passes through all good architecture, whatever its age,

whatever its style, whatever its purpose, unobserved, indeed, by the foolish who have negatived its powers, till this mighty agent has reached us in a thunder-storm, and has wracked even our hospitals and our buildings erected from charity-funds, as though an earthquake had rent their very foundations: no architectural student is ever asked whether he ever so much as heard of the name of geometry.

The resources of statics and architectural dynamics are still open to us; those sciences which, when philosophy was at a low ebb, taught the Romans, and after them the Arabs and the freemasons successively, how to sustain aloft two thousand years and more immense masses of material; and after that, how to raise and sustain aloft for ages, masses thinner than those of our meanest and most crazy modern fabrics; those sciences of high intellect and refinement which in ages past rendered buildings firm, yet daring—rooted to the ground, yet piercing the clouds—mechanical, yet more artist-like than aught of modern work—well enriched, yet not costly—as proverbs in the mouths of all, yet destitute of the slightest approach to vulgarity: while by the sad reversal of exchanging *dynamics* for cements, and statics for pretended taste, even our institutions and many other buildings erected from benevolence, become in the first year of their existence masses of creaking ruins, filling the mind of the Christian, of the philanthropist, and of the genuine architect, with one humiliating feeling of disgust.

PART THE SECOND.

SPECIFICATIONS.

CHAPTER I.

SPECIFICATION OF THE ARTIFICERS' WORK *to be done in the erection of a small* DWELLING-HOUSE, *and in completing the same with the offices and appurtenances thereof fit for use or occupation, upon a certain plot of ground situate for from the drawings and under the superintendence of of architect.*

EXCAVATOR.

Notice, &c., to district-surveyor, &c.

To give to the district-surveyor or other public officer, and to all the other public officers, the requisite notices, to obtain all requisite official licences, and to pay to the district-surveyor and to all the other public officers concerned in the building and works their proper and legal official fees and charges.

Ground-work.

To excavate the ground to the proper levels, and as may be found requisite for the construction of the foundations, the drains, the cess-pools, and all the other works for which the ground will require to be excavated; to beat down to a hard consistence the ground forming the beds and surfaces for the reception of the concrete; to fill in again and level about the foundations and other works, after the same are constructed, the ground so dug out; to perform to the whole ground-plot, upon part of which the house is intended to be erected, such other ground-work as may be requisite in order to level the said ground-plot according to the sectional ground-lines shown by or upon the working-drawings.

Water.

Provide all water required for the execution of the works.

Concrete.

The concrete for the foundations to be composed of clean gravel or breeze, and stone-lime, mixed in the

proportion of one part of lime to six parts of gravel or breeze, to be mixed and thrown, whilst hot, into the trenches, care being taken to keep the concrete level all round in the process, so that it will not be necessary to afterwards disturb it whilst setting. The contractor to state in his tender the price per cubit yard (including digging) at which he will supply any extra concrete that may be required; and any deductions in the quantity required to be also valued from this price.

Trenches for drains.

The trenches for drains to be formed as on the plans to the necessary depths and falls, and are not to be covered in until after inspection and a written order from the architect after the pipes have been tested by him.

Cartage, &c., of rubbish, &c.

To remove and cart away from the whole of the ground-plot, building, and premises, all the earth, soil, and rubbish which will be found superfluous after the ground-plot and soil of the premises are made up to the proper levels and surfaces; and to leave, finally, the whole of the house, ground, and premises, entirely free from superfluous ground, earth, rubbish, and useless materials.

BRICKLAYER.

General brick-work.

To execute, in the very best and in the most careful and workmanlike manner, all brick-work requisite in order to erect and complete the house, with the offices and appurtenances thereof according to the drawings, and which may be also requisite to render the whole of the house and premises complete and finished in every respect.

Gauged arches.

To put to all the front windows (*and other apertures in the front of the building*) the very best gauged arches, accurately cut, and set quite closely in front and at back and at their soffits.

Other arches.

To put to all the other openings in the brick-work plain axed arches.

Facings.

To face the fore or principal front of the house with the very best hard second malm stocks, matched of a light uniform colour, and finished in the neatest possible manner in Flemish bond, with flat joints accurately drawn.

Chimneys.

To properly turn parget and core all the chimney-flues, to finish the chimney-shafts with oversailing

courses as shown on drawings, to be set in the best Portland cement and clean sharp sand, mixed together in equal measures.

Set stoves and ranges.

Set all stoves, ranges, and furnaces with all necessary bricks, fire-bricks, fire-clay, and other material, all to be backed in solid.

Trimmer arches.

To put to each fire-place a half-brick trimmer and a chimney-bar of wrought-iron, half an inch by two and a half inches, eighteen inches longer than the chimney opening, and properly corked at the ends.

Tile crestings, &c.

To finish all the walls except those walls which have eaves, with brick-on-edge and double plain tile cresting, both set in and jointed with the best Portland cement and clean sharp sand, mixed together in equal measures.

Damp corner.

(See p. 240).

Bedding, &c.

To bed in mortar all the plates, lintels, wood-bricks, templets, stone-work, and other work intended to be set in the brick-work, and so requiring; to bed in and point round with lime and hair mortar all the door-frames and window-frames; to back up and fill in with solid brick-work to all stone-work and iron-work intended to be set in the brick-work.

Pointing.

(See p. 150).

Piers.

To construct for the support of the sleepers of the ground-flooring, brick piers not more than four feet apart, each nine inches square, nine inches high, and with the addition of a foundation six inches high and thirteen and a half inches square.

Ventilation.

To build in No. gratings in order to ventilate under boarded floors in basement, with apertures in the walls, so as to pass a thorough current of air under the joists.

Drainage, &c.

To lay to a fall of one and a half inches in ten feet, six-inch socket-jointed earthenware soil drain-pipes, and four-inch branch drains from the rain-water pipes, with proper Y and other junctions, bends, and diminishing pipes trapped to all outlets as shown on the plan of drains.

(In cases where communication cannot be obtained with any public sewer, resort must be

made to the imperfect drainage of a cess-pool of such dimensions as may be thought requisite.)

Cesspools (*if any*).

To construct in the situation shown by the working-drawings two cess-pools, each three feet six inches internal diameter, eight feet deep from the bottom to the underside of the covering (or dome, if any), and steined round with dry four-inch hard stock brick-work, and connected at the level of the springing of the dome with four-inch socket-jointed drain-pipes.

(If it be deemed that the filtration from the cess-pool will impart a dampness to the foundation or other parts of the house, the cess-pool should be wholly sunk in the ground to such a depth as to prevent this inconvenience; and in some cases it is well to set the whole or the upper part of the steining in mortar; but in this case the water within the cess-pool will subside with greater difficulty.)

(Perhaps the best covering for a small cess-pool is Yorkshire stone of sufficient strength, as it can be easily removed without damage, which cannot be the case with a dome of brick-work, and the usual covering of wood is the least durable and the least proper that can be applied. If a cess-pool be large, it will be best domed over with brick-work, having only a circular opening in the vaulting from two to three feet diameter, which opening may be covered with stone in the same manner as the top of a small cess-pool.)

Fence-walls.

(If there be any fence-walls intended to be built, a description of them may be here inserted.)

Rain-water cistern.

When the rain-water can be used, then specify a tank, made in a similar way to the cess-pool, and rendered with Portland cement. (See pp. 282, 306.)

½ Rod extra brick-work.

To provide and execute under the contract for the works, half a rod reduced of the best stock brick-work, to be used in such extra works as the surveyor may direct; the value of such of the said extra brick-work as may not be directed by the surveyor to be used, is, however, to be deducted from the amount of the consideration of the contract, after the rate of
per rod reduced.

Bricks. All the bricks (except where herein otherwise directed) are to be the very best new approved, hard-burnt, square grey-stock bricks, free from breakage, and from all admixture of soft bricks, place-bricks, or other inferior bricks.

Samples. At the commencement of the works the contractor is to submit to the architect samples of bricks for his approval; and those that are chosen by the architect to be considered as the standard of quality for those to be used in the building.

Mortar. The whole of the mortar to be used in the performance of the brick-work is to be compounded in the proportion of one-third by measure of the very best well-burnt stone-lime (here insert the name or description of the lime, whether from Dorking or elsewhere), and two-thirds by measure, of clean sharp Thames sand, well beaten, and worked up together. (A more particular description of the sand may be given, and if from the Thames, whether taken above Westminster Bridge, below which it is thought to be brackish, and to impart saline damp to the work.)

Mode of doing the work. The whole of the brick-work, except where herein otherwise directed, is to be done in manner of English bond (or Flemish bond), and is to be completely laid in and to be entirely flushed up at every course with mortar; and the whole of the foundation-work is to be grouted with liquid mortar at every course (or at every second or third course, if deemed sufficient, and in thicker walls the work may be grouted all the way up). No four courses of the work are to rise more than one inch besides the height of the bricks: and there is to be no difference between the soundness and goodness of the outside work, and of the inside work, no variation be allowed therein, except that the work intended to be plastered is to have the joints thereof left rough for the adherence of the plastering.

Jobbing work. To perform to the house buildings and premises all bricklayer's work which may be requisite thereto in the nature of jobbing, to cut away for, and attend upon, all other tradesmen, when necessary, and to make good after them, leaving the brick-work perfect and complete.

MASON.

(If cramps be preferred for holding together the different pieces composing copings or any other description of stone-work, these should be of copper or gun-metal; for the judicious and careful architect or surveyor will take it as a general rule that it is much better to omit cramps and plugs altogether, rather than to make them of either wrought or cast-iron: if omitted, the stones may, indeed, by settlement or other cause, become displaced, but the corrosion of iron inserted in stone-work invariably rends and destroys the latter; corrosion, sooner or later, is sure to occur to all iron-work, unless embedded a very great distance within the body of the work: the author of this work has never yet used a single iron cramp, nor will he ever do so; the use of copper or gun-metal cramps and plugs may add a trifle to the expense of an edifice, but the employment of iron for the same purpose is to incur an expense altogether useless.

Qualities of stone.

Provide work and set to the several stone dressings shown on the drawings with stone of the best quality of weatherstone, not freshly quarried, all free from vents, shakes, and other defects, and to be set on its natural or quarry bed.

Window sills.

To put to all the windows Portland stone sills, nine inches wide, three and a half inches thick, and properly sunk and weathered; and to put to all the other windows sills of three-inch Yorkshire stone, nine inches wide, tooled fair all over, and laid sloping: all the window sills are to be properly throated. (Sills of Yorkshire paving-stone, though so much used for present saving of outlay, prove very frequently expensive substitutes for handsome architectural stone; for frost will often shiver them from end to end into twenty or thirty detached layers).

Steps, &c.

To put to all the external door-ways Yorkshire stone, solid tooled steps, with the projecting corners of them rounded off, properly back-jointed, and with proper mortise holes for receiving the ends of the door-posts; and to provide and fix a cast-iron shoe-scraper of approved pattern.

Paving.

To provide work all through on the edges thereof, and lay down in regular courses adjoining to the house feet superficial of the best compact two and a half inch Yorkshire stone paving.

To repair and make good all damage which may, by the execution of the work, be caused to the public paving (if any), or to pay to the Local Board such sum of money as they may require for themselves so doing.

Chimney-pieces.

To put to the kitchen and scullery fire-places jambs, mantle, and shelf, each of one and a half inch Portland stone, seven inches wide.

To provide to the best rooms fire-places, value each £0 0 0

To provide to the bed-rooms fire-places, value each £0 0 0

These prices not to include setting, which is to be provided by the contractor, and added to the above prices.

Hearths and slabs.

To put to each fire-place a hearth of two and a half inch Yorkshire stone: to put to the kitchen fire-place a slab of two and a half inch rubbed Yorkshire stone, two feet wide, and fourteen inches longer than the chimney opening; and to put to each of the other fire-places a chimney-slab or front hearth of two-inch Portland-stone, eighteen inches wide and sixteen inches longer than the chimney-opening.

Sinks.

To put in the scullery a glazed stoneware sink, seven inches deep, containing six feet superficial, fixed with proper bearers, and cut out to receive the waste-pipe, and the bell grating thereto, with two-inch lead waste taken through wall to empty over nine-inch yard gulley with iron grating.

Holes, &c., and finishing.

To cut in the mason's work such holes, rebates, mortises, sunk-work, and grooves, as may be requisite for the thorough completion thereof; and to clean off and finish properly the whole of the work, immediately prior to the completion of all the other works of the house and premises. All the mortar used in the work is to be of stone-lime, of the quality described for the brick-work.

SLATER.

Countess slating.

To cover the roofs and the top and sides of the dormers with the very best strong countess slates, securely fixed with strong copper or zinc nails, and pointed on the inside with stone-lime mortar with sufficient hair therein.

Bond, &c.

Every part of the slating is to be properly bonded, particularly at the eaves and at the heading-courses thereof, with cut slates wherever requisite for keeping the bond uniform, instead of having slates laid lengthways with narrow slips between them.

Reparation.

To repair and leave perfect, to the satisfaction of the architect, all the slating at or immediately before the final rendering up of all the works of the premises as complete.

Filleting.

To fillet the slating wherever requisite against the brick-work, with cement, strong cast-iron (*or copper, as the case may be*) nails being first driven into the brick-work, not more than three inches apart, in order to secure the same.

Put to all hips, slate hipping; or when it can be afforded, cut the slates neatly to the hips, leaving a space of about half an inch, and lay under a concealed zinc or lead gutter upon narrow layer boards.

(Lead step flashings are to be preferred to fillets of mortar or cement, and should be used where the employer will permit the extra outlay which they occasion.)

(The best method of covering the joints of slating against walls is by means of projecting and raking weather-courses, in brick or stone, built into the walls, but this is much more expensive than the other modes.)

CARPENTER AND JOINER.

New materials, &c.

To provide sufficient new materials for, and frame, fix, and complete all carpenter's work, and joiner's work, which will be requisite for carrying into effect, and for finishing in every respect, the house with the offices, fittings, and appurtenances thereof, according

to the working-drawings, and so as to render the same complete; and to provide and furnish to the carpenter's work and joiner's work all proper nails, screws, and other needful ironmongery, of the best quality.

(If any of the materials of a former building are to be used again, an allowance to that effect should be here inserted, and should be noticed in the minute particulars of the work.)

Timber and deal. All the oak timber is to be of the best English growth; all the other timber is to be either Dantzic Riga, or Memel yellow fir; all the joiner's work, flooring-boards, skirtings, and other wood-work, are to be of the best yellow Christiania deal, except where herein otherwise directed: all the timber and deal are to be cut out perfectly square, and entirely free from sap-wood, and from shakes, large knots, wany edges, and all other defects.

Sundries. None of the joists, ceiling-joists, rafters, and quarters, are to be respectively more than twelve inches apart, or to be set nearer than twelve inches to any smoke flue.

To provide and fix all requisite centering, turning-pieces, beads, stops, fillets, tilting-fillets, backings, blocks, linings, casings, furrings, and bearers: to provide and fix 112 lbs. of wrought-iron, in such ties, bolts, and straps, as the architect may direct: and to perform such rebating, grooving, tonguing, beading, scribing, chamfering, housing, jointing, mortising, framing, dovetailing, planing, and other work and labour, as may be found requisite for the perfect performance of, and the thorough completion of the whole of the house, and of the offices, fittings, and appurtenances thereof.

Hoarding To provide and fix all requisite temporary hoarding for inclosing the ground-plot, while the several works thereon are being performed.

Shoring. To perform all shoring or strutting (if any be required).

Wood-bricks. To put all wood-bricks requisite for fixing the skirtings, and the other finishings and works so requiring.

Lintels

To put such lintels and filling-in-lintels as may be requisite, in order to carry the brick-work over the openings; each lintel is to be at least three inches high and one inch thicker for every foot of opening more than three feet, fifteen inches longer than the opening, and of the width of the brick-work.

(The only proper use of wood lintels is to receive the wood finishings of apertures in walls; in no instance should they be trusted to for support, as they are subject to the destruction of rot and fire; for these reasons they are better if not much longer than the widths of the openings, and each with an arch sprung above it reaching from end to end of the lintel, so that if the lintel be destroyed, the brick arch above it shall remain sound.) If the soffit be very wide, still two small lintels will be sufficient for maintaining the soffit: there is no occasion for the expense, waste, burthen, and danger, of large solid timber, in such cases.

Ground flooring.

To construct the ground flooring of one and a quarter inch yellow deal, listed free from sap-wood, wrought and laid folding upon fir-joists, four inches by two and a half inches, and with oak sleepers under the joists, scantling four inches by three inches and not more than four feet apart.

(Great care should be taken to avoid the fatal error of inserting wall-plates and other timbers in the brick-work at the ground-story, or in any other situation where they are subject to rot, and, consequently, to render the flooring and walls dangerous.)

One-pair flooring.

To construct the one-pair flooring of inch and a quarter yellow deal listed free from sap-wood, wrought and laid folding upon fir-joists of the scantlings shown on the sections, trimmers and trimming joists being half an inch thicker, and with wall-plates to the back and front, and to one party-wall (if any) of fir scantling four inches by four inches.

Herring-bone strutting.

The floor joists to each room above the basement to have two rows of herring-bone strutting.

Roof over the principal building.

To construct the roof over the principal building with fir timbers and wood-work of the following scantlings and sizes :—

	Ins.	Ins.
Wall-plate	4 by	3
Four tie-beams	10	$2\frac{1}{2}$
Rafters	4	2
Ridge and hips	8	1
Slate-battens	2	1
Lear-boards	8	$0\frac{3}{4}$
Ceiling-joists spiked in one length beneath the tie-beams and secured to fillets at the ends	3	2

Inch yellow deal gutter-boards laid on bearers to a current $1\frac{1}{2}$ inch to every 10 feet run, and with $2\frac{1}{2}$-inch drips.

A dormer, with frame-work and rafters 3 inches by 2 inches, slate battens 2 inches by 1 inch, ridge of $\frac{3}{4}$-inch deal, outer trap-door and inner trap-door, both ledged, and with $\frac{3}{4}$-inch deal beaded stops and linings, and hung with hinges and other ironmongery, value together 6*s*., and with all other requisite fittings and appurtenances.

(A particular description of the proposed ironmongery of the dormer may be given, if such be deemed necessary.)

Roof over the outbuildings.

	Ins.	Ins.
Wall-plates	4 by	$2\frac{1}{2}$
Rafters	4	2
Two angle-ties, each 3 feet long	3	3
Slate-battens	1	2

(If there be any peculiarity in the nature of any of the roofing, it must be distinctly explained.)

Quartered-partitions.

To separate the back and front rooms from each other by fir quartered-partitions, with heads and sills 4 inches by 4 inches, door-posts, side-posts, plates above the doors, and braces, all 4 inches by 3 inches, king-posts and queen-posts 4 inches by 4 inches, quarters 4 inches by 2 inches, and one tier of inter-ties to each story 3 inches by 1 inch.

(Accurate drawings should be made of all the quartered-partitions in an intended building,

whether great or small, in which every thing should be most carefully designed upon the true mechanical principles of trussed work; it is through a neglect of this that by far the larger portion of our dwelling-houses are internally hideously drawn out of level and perpendicular, and are with the floors and door-heads wracked on one side, or are otherwise deformed. And it is highly necessary in altering buildings to take care not to produce the same effect through want of caution and judgment.)

Deal framed partitions.

To separate the rooms in the attics and also where shown in the basement, and inclose the closet under the stairs and the closet by the kitchen by framed partitions three panels high, with rails, stiles, and muntins of $1\frac{1}{2}$ inch deal, and panels of $\frac{3}{4}$ inch deal planks, not glued, and not more than $10\frac{1}{2}$ inches wide.

Skirtings.

To skirt every part of the basement and attics and out-buildings (except the coal-house) with $\frac{3}{4}$ inch deal, 6 inches high, plugged to the walls, to the reception-rooms 12 inch moulded of $1\frac{1}{4}$ thickness, and to bed-rooms and passages 9 inches by 1 inch torus moulded, all to have mitred angles and framed grounds.

Angle-staves.

To put to the angles of the chimney-breasts proper angle-staves, rebated and beaded to such of the rooms as are not intended to be papered.

Windows.

To fit up all the windows with 2 inch ovolo sashes, double hung with iron weights, iron axle pulleys, the best large patent lines, and patent spring fastenings, in deal cased-frames with oak sunk sills; to put all round all the window-frames neat mouldings; and to put to all the windows on the ground-story, except the kitchen and offices, $1\frac{1}{4}$ inch sunk and beaded boxings, inch linings at returns, inch 2-panel bead and butt back linings, $1\frac{1}{4}$ inch beaded front shutters with inch back flaps, hung complete, with 3 pairs of butt hinges in one height; put proper spring shutter bars, with brass knobs.

External doors, &c.

To put to the front doorway a 2 inch deal moulded and bead-butt four-panel door, hung with a pair of 4 inch butt hinges, two 10 inch barrel-bolts, a good

9 inch draw-back iron rimmed lock, with strong brass furniture, and a good ornamental knocker of approved pattern. The two top panels to be glazed with engraved glass, in pattern, to be chosen by the architect.

To put to the back doorway a four panel of $1\frac{1}{2}$ inch bead-butt and square framed door, hung with a pair of $3\frac{1}{2}$ butt hinges, and a Norfolk thumb-latch, and two 10 inch barrel-bolts.

To put to the offices a $\frac{3}{4}$ inch deal ploughed, tongued, beaded, and ledged door, hung with a pair of 18 inch cross-garnet hinges, and a small bolt.

Door-cases, &c.

To put to the external doors fir proper door-cases, 4 inches by 4 inches, with grooved beads to the plastering, and with the door-posts tenoned into the stone steps, with a piece of 4 lb. milled lead, 15 inches square, wrapped round the foot of each door-post, but neither cut nor perforated so as to admit the penetration of moisture.

Internal doors, &c.

To fit up all the internal doorways with four-panel 2 inch square framed doors, with $\frac{3}{4}$ inch deal panels, hung with 3 inch butt hinges and good 6 inch mortise locks, with plain strong brass furniture; and to put to all the doorways mouldings to resemble architraves, and all requisite beaded stops and $1\frac{1}{4}$ inch single rebated linings.

Dwarf closets.

To put at the sides of the fire-places of the front parlour and back parlour, dwarf closets, with inch fine Honduras mahogany tops, fixed with the requisite bearers, $1\frac{1}{4}$ inch deal fronts, and $1\frac{1}{4}$ inch deal square framed folding doors, hung with 3 inch butt-hinges, 5 inch brass flush bolts, and 4 inch good closet-locks, with brass escutcheons; and to put in each closet a shelf of inch deal as wide as the closet will admit of.

To put in each of the other rooms a closet the whole height from the floor to the ceiling, with $1\frac{1}{4}$ inch deal square framed fronts and doors, the doors hung with 3 inch butt-hinges and good 5 inch closet-locks with brass escutcheons; and to put in each of the same closets three shelves of inch deal as wide as the closet will admit of.

Staircase. To construct the staircase according to the working-drawings, with $1\frac{1}{4}$ inch clean yellow deal treads with returned nosings, inch clean yellow deal risers, strong fir bracketed carriages, $1\frac{1}{4}$ inch deal beaded string-boards, inch deal wall-strings, blocked circular bottom step, strong moulded mahogany hand-rail with turned and mitred caps, framed and turned newels $3\frac{1}{2}$ inches by $3\frac{1}{2}$ inches, turned balusters 1 inch square, inch deal apron-linings, and all other fittings and appurtenances of every requisite kind.

Dresser. To put in the kitchen a dresser feet inches long, with $1\frac{1}{2}$ inch clean deal top 2 feet wide, two drawers with inch deal fronts and $\frac{3}{4}$ inch deal dovetailed rims and bottoms, strong legs and bearers, $\frac{3}{4}$ inch deal pot-board on proper bearers, inch deal cut standards, and three sunk inch deal shelves 8 inches average width

W.C.'s. To fit up the W. C. in basement with inch clean deal cross-tongued seat and riser with proper bearers, and with a turned seat cover, and to line round the seat with a $\frac{3}{4}$ inch deal skirting 6 inches high. The up-stairs W.C.'s to be similar but with french polished mahogany seat, flap, and skirtings.

Wood fencing. To inclose the garden and the fore-court with inch yellow deal pales 4 feet long, $2\frac{1}{4}$ inches wide, not more than 4 inches apart, pointed at the top, and fixed to two arris-rails cut out of fir (or oak as the case may be) $4\frac{1}{2}$ inches by $3\frac{1}{2}$ inches, and with posts not more than 8 feet apart (or nearer, if deemed more proper) of sound old (or new, as the case may be) oak 7 feet 6 inches long, 5 inches by 5 inches, and each with two sound old (or new) oak spurs 4 feet long, 4 inches by 3 inches. The oak posts and spurs are to be thoroughly pitched all over before they are inserted in the ground.

To put in the fence before the front entrance a gate similar to the paling, framed and hung complete, with stops, a pair of 24 inch cross-garnet hinges, a bolt, and a draw-back lock.

Bath top. (See p. 273).

Pipe casing. (See p. 292).

Dust-bin. (See p. 103).

Jobbing work. To perform to the house, and to the offices, fittings and appurtenances thereof, all such carpenter's work and joiner's work as may be necessary thereto in the nature of jobbing.

Ten feet cube of fir extra. To provide and fix under the contract 10 cubic feet of the best Baltic yellow fir timber in addition to that fully requisite for the completion of the works, to be used in such additional rafters, quarters, joists, or other unplaned timber-work as the architect may direct; the value of all such of the said extra timber-work as may not be directed by the architect to be used is, however, to be deducted from the amount of the consideration of the contract after the rate of per cubic foot.

PLASTERER.

Ceilings, &c. To lath, plaster, set, and whiten ceilings and strings to every part of the house and of the out-buildings, the coal-house excepted.

Quartered partitions. To lath, plaster, and set the whole of the quartered-partitions.

Rendering. To render and set the whole of the internal brick-work of the house and out-buildings, that to the coal-house excepted.

Colouring. To colour of such tints of stone-colour as may be directed, the plastered sides of the whole of the house and of the out-buildings, except of the entrance-passage, the staircase, and the sitting and bedrooms.

If there be any cornices their description must be inserted, stating their girth in inches, and describing any ornamentation (if any be required).

SMITH AND PLUMBER.

Gutters, &c. To line the gutters with 6lb. milled-lead, turned up 9 inches under the slates, and turned up 5 inches next the brick-work, and to put flashings of 4lb. milled-lead $4\frac{1}{2}$ inches wide in the brick-work all round the gutters.

Dormer. To put all round the dormer a flashing of 4lb. milled-lead, 12 inches average width; and to cover the ridge of the dormer roof with 4lb. milled-lead, 15 inches wide.

Grates. Provide and set to bed rooms, grates,

			average	£1	0 0
„	„	best rooms	„	2	10 0
„	„	kitchen range	„	5	0 0

Eaves'-guttering. To put to the eaves cast-iron 4-inch trough guttering, with stopped ends and outlets, put together with red lead, and securely fixed on strong wrought-iron brackets.

Rain-water-pipes. To put from the eave-gutters No. stacks of cast-iron rain-water-pipe 3 inches bore, and from the iron eaves'-gutter a cast-iron rain-water-pipe, $2\frac{1}{2}$ inches bore; each pipe is to be securely fixed, with head and shoe complete.

Provide and fix to the basement and kitchen windows, without shutters, inch iron bars, $\frac{5}{8}$ inch in circumference, screwed to the window frames.

Waste-pipe, &c. To put from the sink to the drain a 2 inch strong lead waste-pipe with a large bell-trapped grating.

Laying on water &c. Fix where shown on plan a 200-gallon galvanized iron cistern upon proper bearers, and fitted with lead waste; lay on from the main, inch iron water-piping, securely fixed and jointed; with ball-cock complete, $\frac{3}{4}$ inch iron service to sink, with brass cock, and $\frac{3}{4}$ inch service to W.C.

W.C. apparatus. Fit up the W.C. with patent wash-out closet apparatus, 4 inch lead soil pipe connected with a 4 inch iron soil-pipe to be carried down outside the house, with plain head and connection with drain-pipe, and ventilating-pipe above the head carried 3 feet above the eaves, capped with conical top.

PAINTER.

To knot, stop, pumice, and smooth in every part, prepare properly, and paint four times with good and proper oil colour, the whole of the wood-works, iron-

works, and other works usually painted of the whole of the house, and of the offices, fittings and appurtenances thereof.

The sashes are to be finished to choice; the front door is to be painted green, and to be twice varnished with the best copal; all the other painting is to be finished with such tints of plain colours as the architect may direct; and the number of the house is to be neatly painted upon the front entrance door.

GLAZIER.

To glaze the whole of the windows with good second Newcastle glass, properly bedded, bradded, and back puttied; and to clean and leave perfect the whole of the glass at or immediately before the final rendering up of the house and premises as complete.

PAPER-HANGER.

To prepare properly and hang the whole of the plastered sides of the two front rooms, and of the passage and staircase, with figured paper value per piece, cut close.

CHAPTER II.

SPECIFICATION OF THE ARTIFICERS' WORK *required to be done in the erection of a dwelling house and shop, and in completing the same, with offices and appurtenances thereof, fit for occupation, at the corner of two streets, in the City of London, from the drawings, and under the superintendence of of , architect, for of .*

Notice to district surveyor, &c. (See p. 75).

EXCAVATOR.

Remove old party wall. To take down carefully, and remove from the ground as the contractor's property, the whole of the materials and rubbish, in the present old party-wall.

(If "*the owner or owners, who shall be entitled to "the improved rent of the adjoining building or ground,*" be chargeable with any portion of the expense of a new party-wall, an exact account should be taken of the quantity of brick-work in any old party-wall, and of the quantity of timber in any old timber partition, which may be removed before the new party-wall is built, in order that the requisite allowance may be made for such old materials.)

Digging. To dig out the ground for all the foundations, the basement story, the areas, the vaults, the drains, and wherever else may be requisite for the proper performance of the other works; to fill in again properly the ground to the footings, foundations, and other works, and to cart away all the superfluous ground. (See p. 75).

To bale out and remove from the foundations all water which may come into or upon the same, by reason of springs, rain, or otherwise.

Rubbish, &c. (See p. 76).

Concrete. (See p. 75).

BRICKLAYER.

General brick-work. To execute in the very best manner all brick-work requisite for carrying into effect the design of the

building and works, according to the drawings and directions of the architect, including the whole of the party-wall, without the contractor being entitled to any claim for the value of the moiety thereof, from the party or parties concerned in the adjoining premises. (See p. 76).

Samples. (See p. 79).

Rough and other arches. To turn rough arches, wherever the same can be with convenience effected. (See p. 76).

Chimneys, &c. To properly turn, parget, and core all the flues; to put to each fire-place a 4 inch brick trimmer; the trimmers of the kitchen and laundry are to be carried each the whole length of the west ends of the rooms. (See p. 76). *(This kitchen was erected on the one-pair story.)*

Brick facings and arches. To face the whole of the east and north fronts of the building, and the portions of the party-wall, chimney-shafts, and other brick-work which will rise above the roof, with the best hard red (or grey) bricks, laid in the neatest possible manner, with arches (except where there are to be stone dressings) formed of red bricks moulded to detail.

Cornice, strings, &c. To form the cornice, strings, chimney-stacks, &c., shown on the elevations, to be in moulded and other bricks, with oversailing courses, according to the detail working drawings. The three top courses of cornice, and the capping of chimney-shafts, to be set in cement.

Bedding, &c. To bed in and point round with lime and hair mortar all the window-frames, door-frames, story-posts, and the other works requiring the same; and to lay in mortar all the plates, wood-bricks, templets, and all the other timbers, stone-work, and other works which are intended to be inserted in the brick-work.

Paving. To pave the coal-cellar with hard grey stock-bricks laid flat (or on edge, as the case may be) in mortar, upon a layer of concrete six inches thick.

Cement. To build the three circular area walls in 4 inch brick-work, laid in cement and clean sharp sand, mixed together in equal measures.

Coping. To cope the wall behind the chimney-shaft with brick-on-edge, and double plain tile cresting, set in and jointed with cement and sand.

Drainage. (See p. 77).

To put shoots leading into the drain from the rain-water-pipe, water-closets, and each of the areas.

Piers. (See p. 77).

Ventilation. (See p. 77).

Bricks. All the bricks (except for the facings) are to be new approved grey stock-bricks, free from soft bricks, place-bricks, or other inferior bricks.

Mortar. The whole of the mortar is to be compounded in the proportion of one third by measure of the very best Dorking stone-lime, and two-thirds by measure of sharp sand, well beaten and worked up together.

Grouting. The whole of the brick-work is to be grouted at every third course, particular care being taken that the facings shall not be stained.

Mode of doing the work. No four courses of work are to rise more than one inch exclusive of the bricks. All the external walls above ground are to be scrupulously carried up in Flemish bond throughout their whole thickness, with the heading bricks carried through both withinside and withoutside; all the other brick-work is to be laid in the manner of English bond. (See p. 78).

Reparation of accidents, &c. All the walls are to be built level and perpendicular, except where otherwise directed; and should any damage occur to the work by accident, settlement, or otherwise, within twelve calendar months from the completion of the building, the contractor is to make the same good as shall be directed by the architect.

(The liability of a contractor to make good settlements must be taken with great limitation, for they often result from bad design and bad foundation, over neither of which he may have had control: he should be no further liable than for

settlements which are the result of bad materials and workmanship).

Fix iron safe. To fix in the brickwork an iron safe to be provided by ——, where shown on the plans of the ground floor.

Set copper. To set a washing-copper to hold 20 gallons, with proper furnace, furnace-bars, and door complete, all set in fire-bricks.

Cutting, &c. To cut out for all the various works as the same may require, and to make good where necessary thereto; to cut all requisite splays and skew-backs.

Jobbing-work. (See p. 79).

MASON.

Stone dressings. The whole of the stone dressings, such as arches, window-panels, door-jambs, heads, cornices, strings, piers, and other work indicated by a yellow tint on the elevations, to be executed in the best Portland stone, free from vents, shakes, sand cracks, and all other defects; all stone to be laid upon its natural or quarry bed, and for exterior work, the best weather stone to be used.

Window sills. To put to the whole of the windows sills of Portland stone $4\frac{1}{2}$ inches by 9 inches, properly sunk, weathered, throated, and moulded. (See p. 80).

Corbel. To put a corbel of 6 inch Yorkshire stone to support one of the jambs of the best chamber chimney, the corbel is to be of the width of the jamb, and is to tail through the whole thickness of the wall.

Coping to wing-walls. To cope the two wing-walls from the chimney-shafts to the fronts with 3 inch Portland stone, properly weathered and throated, sailing over $1\frac{1}{2}$ inch each way, and cramped with copper cramps.

Marble chimney-pieces. To put in the dining-room a marble chimney-piece according to the drawings, fixed complete, of the value of £6.

To put in the parlour a plain marble chimney-piece, with a Portland stone slab, together with the fixing, in value five guineas.

Portland stone chimney-pieces.

To put to the kitchen fire-place a chimney-piece, with 2 inch Portland stone jambs and mantle, 8 inches wide.

To put in the best chamber a neat boxed Portland stone chimney-piece, value £2.

To put to the remainder of the fire-places plain $1\frac{1}{4}$ inch Portland stone jambs and mantles, $5\frac{1}{2}$ inches wide.

Setting.

To set the whole of the above fire-places, the setting not to be included in the above prices.

Hearths, &c.

To put to the whole of the fire-places back hearths of $2\frac{1}{2}$ inch rubbed Yorkshire stone; to put to the kitchen and to the laundry foot-paces of $2\frac{1}{2}$ rubbed Yorkshire stone the whole length of the rooms, and extending 4 feet wide beyond the chimney-fronts.

Slabs.

To put to all the other fire-places slabs of $1\frac{1}{2}$ inch Portland stone, 1 foot 6 inches wide.

Yorkshire stone paving in basement

To pave the whole of the basement-story (except the coal-cellar) with $2\frac{1}{2}$ inch Yorkshire stone, laid in regular courses, with the edges thereof wrought fair through the whole thickness of the stone, and with two sink-stones therein, each sunk and pierced with five holes.

Basement stairs.

To construct the two flights of stairs from the ground-floor down to the basement-floor of the best compact 3 inch Yorkshire stone, according to the drawing.

Coal-plate stone.

To provide and bed in the paving a piece of 3 inch Yorkshire stone 2 feet square, properly wrought to receive a coal-plate.

Sink.

To put in the scullery a sink of Yorkshire stone 7 inches deep according to the plan, cut out for the waste-pipe and fixed complete. (See p. 81.)

Cutting out, &c.

To cut out for all iron and other works where requisite, and to clean off the stone-work at or immediately before the completion of the building.

SLATER.

(See p. 81).

CARPENTER AND JOINER.

New materials. To provide materials for and frame and fix carpenter's work and joiner's work sufficient for rendering every part of the house and premises complete, with all requisite ironmongery and brass furniture of the best quality.

Timber and deals. (See p. 83).

Hoarding. To put up and maintain such sufficient hoarding and other protection for passengers as may be from time to time required by the proper public authorities.

Wood-bricks or fillets. To put the wood-bricks or fillets requisite for fixing the finishings of the building.

Lintels. (See p. 83).

Centering. To provide, fix, ease when so directed, and finally remove all centerings requisite for the vaults, trimmers, arches, and other works reqniring the same.

Battening. To batten with inch deal the circular wall of the dining-room. (See p. 69).

Sundries. (See p. 82).

		Ins.	Ins.
Floor joists.	Joists to the ground-story laid upon the iron girders	9 by	$2\frac{1}{2}$
	Wall-plates to all the other floors	5	4
	Joists to all the other floors...	10	$2\frac{1}{2}$
	Trimmers and trimming-joists chamfered away at bottom to afford a proper key to the plastering	10	$3\frac{1}{2}$
	$1\frac{1}{2}$ inch yellow deal rebated and fillletted floor to the shop.		
	Inch yellow (or white) deal (as the case may be) floors of half boards to all the other parts of the house.		
Roof.	Lower wall-plate upon the joists of the two-pair floor	6	$2\frac{1}{2}$

	Ins.	Ins.
Rafters to the lower roof at bottom 6 inches by $2\frac{1}{2}$ inches at top	4 by	$2\frac{1}{2}$
Two tiers of inter-ties between ditto ...	3	2
Curb plate	6	4

Inch yellow deal gutter-boards and bearers with $2\frac{1}{2}$ inch rebated drips and current $1\frac{1}{2}$ inch to 10 feet.

Attic Dormer-window-dressings, according to the drawings, with $1\frac{1}{4}$ inch yellow deal casings with mouldings, &c. complete, and 1 inch side linings scribed to the slating.

Ceiling-joists, spiked in one length... ...	3	2
Tie-beams	8	$3\frac{1}{2}$
Rafters to the upper roof	6	$2\frac{1}{2}$
Angle-ties, each 3 feet 6 inches long ...	5	$2\frac{1}{2}$
Circular bearers to hip	4	$1\frac{1}{2}$

$\frac{3}{4}$ inch yellow deal slate-boarding (or battens, as the case may be.)

A dormer with quarters at the sides thereof 4 inches by 2 inches; posts, 4 inches by 4 inches; oak sunk sill, 4 inches by 3 inches; plates, 4 inches by $2\frac{1}{2}$ inches; joists, $4\frac{1}{2}$ inches by 2 inches; boarding at the top and side of inch yellow deal, and with a pair of folding $1\frac{1}{2}$ inch ovolo casements (or with inch deal proper ledged and tongued internal and external trap-doors, as the case may be) hung with linings, frame hinges, and 2 bolts, complete.

The inside of the dormer is to be lined with $\frac{3}{4}$ inch deal rebated and beaded linings.

To provide a strong wrought and framed step-ladder for ascending to the roof through the dormer.

Shop front.

	Ins.	Ins.
Four fir story-posts set in lead (see index for iron sockets and columns)	13 by	4
Breast-summer	13	15
Stall-board, moulded in front	12	3

$1\frac{1}{4}$ inch keyed clean deal fascia with architrave-mould, and cornice with $1\frac{1}{2}$ inch deal brackets, and inch deal cover-board.

$1\frac{1}{4}$ inch clean deal glued blocked and mitred

pilasters, with cast-iron bases, and moulded wood capitals with cast-iron enrichments.

Two fluted Ionic columns of 2 inch deal, with cast-iron bases, cast-iron enriched ovolo and volutes, and the other parts of the capitals executed in wood.

$1\frac{1}{2}$ inch dado beneath the stall-board, with deal base-mouldings of the same profile as to the pilasters.

2 inch deal chamfered-bar sashes fixed with stops and linings complete.

Revolving shutters.

Form boxings for revolving shutters, made by ; the whole to be left complete, and in good order. (It is better, where possible, that the shutters should coil into the head of the window.)

$\frac{3}{4}$ inch tongued and beaded linings and backings to the breast-summer, story-posts, and muntins; and all other fittings requisite for making the shop-front complete.

2 inch bead-flush and square framed folding circular sashed shop doors with inch bead-flush and bead-butt shutters, hung in a fir proper door-case 5 inches by 4 inches with transom 4 inches by 3 inches, with three pairs of 4 inch butt hinges, two bright barrel-bolts, an 8 inch best draw-back lock, and a brass knocker.

Linings to shop.

To line round the whole of the walls of the shop with $\frac{3}{4}$ inch yellow deal, matched and beaded, and with the requisite backings.

Skirting.

To put round all the walls of best rooms and passages of ground and first floor, 8 inch moulded skirtings; to other parts of house, inch square skirting 6 inches high, all plugged to walls.

Quartered-partitions.

To put quartered-partitions, according to the drawings, with posts head and sill 4 inches by 4 inches, brace 3 inches by 3 inches, quarters 4 inches by $2\frac{1}{2}$ inches, and three tiers of inter-ties 4 inches by $1\frac{1}{4}$ inch. (See p. 84).

Private door.

To put to the private entrance a $2\frac{1}{4}$ inch four-panel moulded and bead flush door, hung complete in a fir proper door-case 4 inches by 5 inches, with hinges and fastenings as to the shop doors; to line round the door-way, with inch tongued and beaded deal.

Dining-room folding doors.

To put to the dining-room a pair of folding doors, framed and moulded according to the drawings, the part thereof forming the room entrance-door is to be 2 inches thick, the fixed part of the door is to be $1\frac{1}{2}$ inch thick, the room door is to be hung with a pair of 4 inch butt hinges, and a best mortise lock, with plain brass furniture.

Closet-doors to dining-room.

To put to the two closets in the dining-room $1\frac{1}{2}$ inch four-panel moulded and square framed doors, hung complete each with a pair $3\frac{1}{2}$ inch butt-hinges, and a good iron rimmed lock with plain brass furniture.

Two-pair room-doors.

To put to the whole of the rooms of the two-pair story 2 inch moulded and square framed doors, hung complete, with 4 inch butt-hinges, with a best mortise lock, with plain furniture to each.

Basement doors.

To put to the basement story 2 inch four-panel bead butt and square framed doors, hung complete with $3\frac{1}{2}$ inch butt-hinges, and 7 inch stock-locks, in oak door-cases 4 inches by 4 inches: to fit up the coal-cellar doorway, with inch coal-boards 4 feet 6 inches high, in proper slides.

Other doors.

To put to all the remainder of the rooms, closets, and other parts of the house, 2 inch four-panel square framed doors, hung with $3\frac{1}{2}$ inch butt-hinges, a good dead lock to each of the closets, and a 7 inch best iron-rimmed brass knob lock, with plain brass furniture to each of the other doors: the water-closet is to have in addition a small bolt.

Door-linings, grounds, architraves, &c.

To put to all the doors requiring the same $1\frac{1}{4}$ inch single rebated linings, and inch framed grounds $4\frac{1}{4}$ inch wide; and to put round all the doors mouldings to form architraves according to the drawings.

Dwarf closets in parlour.

To put in the parlour two dwarf closets, with $1\frac{1}{4}$ inch moulded folding doors, hung in beaded fronts with $2\frac{1}{2}$ inch butt-hinges, and with two bolts and a good lock to each closet; to cover each closet with

inch Spanish mahogany, moulded in front, and skirted over with ½ inch moulded Spanish mahogany 4 inches wide; and to put in each closet a shelf of inch deal, 10 inches wide.

Shelves in closets.

To fit up all the other closets, each with four tiers of inch shelves all round three sides of each closet, the lower shelf round the store-closet is to be 12 inches wide, all the other shelves are to be 8½ inches wide.

Fan-lights.

To put over the two outer doors 2 inch deal moulded fan-lights, according to the drawings.

Dining-room windows.

To put to the two windows of the dining-room 2 inch astragal and hollow sashes, double hung with brass axle-pulleys, large patent lines, iron weights, and patent spring fastenings, in deal cased frames, with oak sunk sills.

To fit up the two windows with 1½ inch sunk and beaded boxings with mouldings laid round the same in order to form architraves, inch return linings at the sides of the boxings, inch three-panel bead-butt back-linings, 1¼ inch shutters three panels high, moulded in front and hung with hinges complete in one height and prepared to hang in two heights, 1¼ inch moulded soffits, backs and elbows, beaded cappings, and 30 inch spring shutter-bars.

Other windows.

To put to all the other windows throughout the house, 2 inch ovolo sashes, double hung with brass axle-pullies, large patent lines, iron weights, and spring fastenings, in deal cased frames with oak sunk sills: to put round all the same windows inch deal tongued linings, with inch deal grounds 4 inches wide, with moulding laid round the same, in order to form architraves.

Shutters to parlour

To put to the parlour windows similar shutters to the dining-room windows.

Mantle-shelves. (deal).

To put to all the plain chimney-pieces mantle-shelves of inch deal, moulded, 6½ inches wide.

(If incombustible mantle-shelves be preferred, they may be made of Portland stone).

Upper water-closet.

To fit up and complete the upper water-closet, with inch square-framed Spanish mahogany riser, inch pencil-cedar seat, inch mortise-clamped Spanish mahogany frame and flap, with moulded nosing, and the flap hung with brass hinges: to put neat casings to conceal the pipes; and to provide and fix to the water-closet all other requisite fittings: to put in the water-closet a neat mahogany small shelf, with mahogany edging 3 inches wide. To put in the closet adjoining to the water-closet a sink of $1\frac{1}{4}$ inch deal, with a sliding shutter front, hung with weights and lines, and a dwarf $1\frac{1}{2}$ inch square-framed door under the sink, hung with $2\frac{1}{2}$ inch butt-hinges, and a brass turn-buckle (or a stoneware sink may be used).

Pipe casing.

Lower water-closet.

To fit up the lower water-closet with $1\frac{1}{2}$ inch deal seat riser and clamped flap, the flap hung with hinges and all other proper work complete.

Staircase.

To construct the stair-case according to the drawings, with $1\frac{1}{4}$ inch clean deal treads, landings, and risers with moulded returned nosings, strong bracketed carriage, $1\frac{1}{2}$ inch wall-string, $1\frac{1}{4}$ inch sunk beaded cut and mitred outer string-board, bar dove-tailed balusters $1\frac{1}{8}$ inch square (each tenth baluster of wrought iron), Spanish mahogany moulded handrail, with ramps and scroll, and curtail bottom step to the stairs.

Dresser.

To provide and fix in the kitchen, a dresser complete with $1\frac{1}{2}$ inch clean deal top, two drawers with locks and brass-drop handles, inch deal pot-board with bearers, and inclosure beneath the dresser, with a pair of $1\frac{1}{4}$ inch square framed folding-doors, with a bolt and a brass turn-buckle; to put over the dresser four tiers of inch deal sunk shelves 9 inches average width, $1\frac{1}{4}$ inch framed and cut standards, and moulded fascia at the top.

Cistern.

To put in the kitchen a cistern case, of $1\frac{1}{4}$ inch deal dove-tailed, as long as the situation will admit, 2 feet 6 inches wide inside, and 2 feet 9 inches deep inside: to put to the cistern the requisite bearers, and a cover of $\frac{3}{4}$ inch deal, ledged, and with a wood handle.

Cistern.

(If galvanized iron cisterns be preferred, see p. 90).

Plate-rack.

To put under the cistern a proper plate-rack complete, as long as the situation will admit.

Dust-bin. To put in the yard where directed a dust-bin complete, of $1\frac{1}{4}$ inch deal, with sliding door in front, ledged $\frac{3}{4}$ inch trap-door hung complete, and a sieve with handle and proper runners, and brick sides built in cement, with the bottom rendered in cement.

Sundries. To fix all the iron-work; to provide and fix all requisite beads, stops, grounds, fillets, tilting-fillets, blocks, and other fittings and work requisite for completing the whole building, and the appurtenances thereof.

Jobbing work. To perform to the house, buildings, and premises, and to the appurtenances thereof, all such carpenter's work and joiner's work, as may be necessary in the nature of jobbing.

SMITH.

Chimney-bars. To put to each of the fire-places a wrought-iron chimney-bar $2\frac{1}{2}$ inches by $\frac{1}{2}$ inch, properly corked at the ends thereof.

Grates. To provide and set grates to the bed-

		rooms, average price	£1	0	0
„	„	best rooms „	4	0	0
„	„	kitchen range „	7	10	0

Four girders and iron wall plate. To put to the ground-flooring, four rolled iron girders, average scantling 9 inches by 3 inches, laid upon a cast-iron chain-plate 3 inches by $1\frac{1}{2}$ inch, continued all round the four principal walls.

Bolts to brick-trimmers. To put four 1 inch bolts with nuts and washers, to prevent the brick trimmers of the kitchen and laundry from spreading.

Cast-iron columns. To put under the breast-summers, four cast-iron columns $3\frac{1}{2}$ inches square, with caps and plates at top and bottom 1 foot 6 inches by 1 foot and $1\frac{1}{4}$ inch thick.

224 lbs. ties, &c. To provide and fix 224 pounds avoirdupoise of wrought-iron ties, bolts, and straps, to secure the breast-summers, floors, and roofs.

Area gratings. To provide and fix over the areas, 3 cast-iron gratings according to the drawings, with frames $1\frac{1}{8}$ inch square, filled in with bars $1\frac{1}{8}$ inch by $\frac{5}{8}$ inch, not more than $1\frac{1}{2}$ inch apart; the gratings are to be run with lead into the paving.

4-inch cast-iron rain-water-pipe. To provide and fix No. complete stacks of 4 inch cast-iron rain-water-pipe, to lead from the roof down into the drain, with head and shoe complete.

Coal-plate. To provide a cast-iron plate with proper fastenings for the coal-shoot.

Four balconies. To provide and fix at the one-pair windows, four ornamental balconies of wrought-iron according to the drawings.

BELL-HANGER.

Bells. To provide and hang with cranks, wires, and all proper appurtenances complete, the following bells, viz., three bells in the kitchen, with one lever-pull in the parlour, two lever ornamental pulls in the dining-room, and a pull in the best chamber; to provide and hang another bell in the servant's chamber with a pull in the best chamber; and to provide and hang within the kitchen two bells with pulls thereto, one from each external door; and to put written labels to all the bells.

PLASTERER.

Floated ceilings. To lath, plaster, float, set, and whiten ceilings and strings throughout the house.

Render float and set. To render, float, and set the walls of the one-pair and two-pair stories above the wainscotting.

Troweled stucco. To execute in floated troweled stucco the brick-work of the staircase, kitchen, and parlour, above the dwarf-wainscotting. (See carpenter's work.)

Lathing, &c. To lath all the quarters and other parts so requiring, and to plaster, float, and set the same.

Enriched cornice, &c. To execute according to the drawings and whiten the enriched cornice of the dining-room.

Lime-whiting. To lime-whiten twice all the unplastered brick-work of the basement-story, and of the cellars and areas.

Sundries. To run and execute all requisite beads, quirks, and arrises.

PLUMBER.

Gutters. To lay the gutter-boards with milled-lead, weight 6½lbs. to the foot superficial, turned up 5 inches high

next the brick-work and 9 inches wide next the rafters, and to put thereto flashings of 4lb. milled-lead 5 inches wide.

Step-flashings, &c. To put at the heading and sides of the roof, flashings of 4lb. milled-lead 11 inches average width, set step-wise to the raking parts of the roof.

Flashing to curb plate. To put at the curb-plate of the roof a flashing of 4lb. milled-lead 10 inches wide.

Covering of hip. To cover the circular corner hip with 4lb. milled-lead according to the drawings.

Covering of attic windows. To cover the attic window-heads with 6lb. milled-lead 9 inches wide.

Dormer. To cover the top and sides of the dormer with 6lb. milled-lead turned down 6 inches over the slating, and to put at the foot of the dormer-door an apron of the same description of lead 12 inches wide.

Copper eaves' gutter and pipe. To put round the eaves at the curb-plate 3 inch copper guttering, fixed with bands and brackets complete, and with two $2\frac{1}{2}$ inch copper pipes leading into the gutter below, with neat heads and proper shoes.

Covering of shop front, &c. To cover the top of shop-front with 6lb. milled-lead turned up 6 inches high against the brick-work, and with a flashing of 4lb. milled-lead, 5 inches wide, let into the brick-work.

Water-closets. Fit up the water-closets with patent wash out closet apparatus and 4 inch lead soil pipe connected with the outside iron soil pipes.

Waste pipes. 2 inch lead waste pipe from bath with syphon trap at junction with soil pipe, and $1\frac{1}{2}$ inch ditto from lavatory with syphon trap.

Lavatory. Fit up to lavatory a Jennings's patent up-up wash basin complete.

Soil-pipes and ventilators. Fix where shown in the plans a 4 inch cast-iron pipe with leaded joints and plain head for soil pipe, properly connected with the drains, and carry up the piping above the head to five feet above the eaves, with conical exhaust capping as ventilator. Fix a

2 inch zinc pipe from the nozzle in the water-closet pan and carry up in the same way.

Cisterns. Put in cistern-room two strong galvanized-iron cisterns, each to hold 300 gallons, one for service to baths, water-closets, and lavatories, and the other for domestic purposes, both to have warming pipes as required by the water company.

Lay on water. Lay on from the company 1 inch strong lead supply to the cisterns with ball-cock complete, and all proper bends and junctions as required by the company.

Service pipes. Provide to the bath, the water-closets, the lavatory, sinks, and other parts of the house where water is required with $\frac{3}{4}$ inch medium lead service-pipes with all proper junctions, bends, and stops, and the taps and cocks required by the water company.

Water waste preventor. Fit up in water-closets an iron cistern and approved water-waste preventor complete.

Bath. The bath to be strong galvanized iron, 5 ft. 6 in. in length.

Hot water, service, and bath room. Lay to bath a hot-water service from the kitchen range with wrought-iron saddle boiler set at the back of the kitchener; strong steam 1 inch pipe, return and flow, to 50 gallon galvanized iron hot-water cistern in bath-room, which is to be fixed on iron brackets where directed. Lay on the hot water to the sink in the scullery and the lavatory, and also for pail service in bath-room. A cold-water service is also to be provided in the bath-room. Brass $\frac{3}{4}$ inch bib-taps for this service, and named taps to the bath.

Butlers' sink. (See p. 259).

Testing. The whole of the water service to be tested as to its working at the completion.

PAINTER.

Four times in oil to iron-work. To paint four times with the best oil-colour all the iron-work of every description belonging to the premises, the first two coats thereof being done with red-lead paint.

Four times in oil. To knot, stop, prepare properly, and paint four

times with the best oil-colour, the whole of the woodwork, stucco-work, and the other works throughout the premises which usually are painted.

Flatting and colours.

To flat extra the dining-room and the best chamber with three tints of colour.

The whole of the sashes are to be finished outside to choice; all the doors are to be finished in three shades of green; the other painting is to be finished of such tints of plain colours as the architect shall direct.

Graining,

To grain extra in the best manner in imitation of wainscoat, and varnish twice with strong copal varnish the whole of the doors within the house on the ground-story thereof, and all the sides next the kitchen and staircase of the doors on the one-pair story thereof.

GLAZIER.

Ground glass.

To glaze the closet-window with ground glass of good quality.

Best glass.

To glaze the shop-windows and the windows of the dining-room with the very best British plate glass.

Second glass.

To glaze all the remainder of the windows and lights throughout the house with good second Newcastle crown glass.

All the glazing is to be properly bedded, bradded, and back puttied, and is to be cleaned and left perfect at the rendering up of the premises as complete.

PAPER-HANGER.

Dining-rooms paper —*d.* under lining and gilt moulding.

To paper the dining-room with paper value *d.* per piece, with an underlining paper.

Paper —*d.* border —*d.*

To paper the whole of the two-pair story and the closets of the one-pair story with paper value *d.* per piece.

CHAPTER III.

SPECIFICATION *for works to be done according to a set of working-drawings signed with and forming part of the contract for in the erection of a* DWELLING-HOUSE, *with offices thereto belonging, on a plot of ground situate and being the site of the house and premises No. and in the entire completion thereof fit for use and occupation in all respects, except the plumbing, glazing, and painting of the said intended dwelling-house and of the offices thereof, the works in which three trades are intended to be specially excepted from the contract.* (For these trades see pp. 103 to 107).

EXCAVATOR AND BRICKLAYER.

Notices, &c., to district-surveyor, &c.

To give to the district-surveyor all proper notices, and to pay to him his proper official fees.

To obtain from the commissioners of paving, the surveyor of pavements, and the commissioners of sewers, all requisite licences and permissions to erect hoards and scaffolds, and for making areas, and for entering the public drains; and to pay all proper official fees and charges attendant upon obtaining such licences and permissions.

Pulling down old materials, &c.

To take down and break up all the old brick-work on the site of the intended new works; to clean and stack up such of the old bricks, not exceeding in number 10,000, as may remain sound and fit to be again used; and to remove and cart away immediately from the premises all the other old bricks. (See p. 92).

Digging, &c.

To clear away from the site of the intended new works all the old foundation-walls and other impediments; and to excavate the ground for the basement-story, the foundations, the areas, the drains, the floors, and all the other works which may so require; to render level and hard the bottoms of all the trenches, and to fill in and consolidate properly the ground about all the footings, basement-walls, drains, and other works; and generally to work, fill up, remove, and level the ground in and about the intended new

works and the site thereof as shown by the drawings and as shall be found requisite. (See p. 75).

Concrete. (See p. 75).

Rubbish, &c. (See p. 76).

Concrete, filling in. To spread under the floor of the back part of the shop, and all round against the outside of the basement, against which the ground would otherwise lie, a layer of concrete full 6 inches thick.

General brick-work. (See p. 76).

Party-walls. The contract is to include only such portions of the party-walls as will belong when done to , and is to include no portion of the moiety of any party-wall which from the foundation to 18 inches above the adjoining roofs will belong to any adjoining building, and where any of the adjoining buildings rise higher than the intended new building the contract is in such case to include only a moiety of the new walling from the foundation to 18 inches above the roof of the new building, but these exceptions are not intended to exclude from the contract any portions of the chimney-shafts.

(For cases where the whole of the party-walls are included in the contract, see p. 92).

South and west walls. To take down and remove the defective and insufficient parts of the south and west walls, to raise the same walls to the height shown by the drawings, and to rake out, repair thoroughly, and point neatly the remainder of the said walls.

Gauged arches. To put to the heads of the two niches, also to all the openings above the ground-story in the principal front next , and to the three openings in the wall on the north side under the gateway, the very best gauged arches, according to the drawings, accurately cut and set.

Uncut arches. To turn neat uncut arches over all the other internal and external openings throughout the building, tuck-pointed on the outside; and to turn counter-arches and discharging-arches in the building wherever the architect may so direct.

Facings. To face the eastern front of the building with the very best hard grey stock-bricks matched to a light uniform colour, and finished in the neatest possible manner in Flemish bond with flat joints. (See p. 76).

Brick cornice. To execute according to the drawings in the best hard red and malm stock-bricks, the front parapet-cornice and string courses, with moulded bricks, the whole thereof being accurately and neatly set and worked according to the detail drawings, and properly bonded with the stone-work and strings.

Cement courses. Set the whole of the cornice, the oversailing courses of strings, and the cappings of chimney-shafts, in cement.

Chimneys. To properly turn, parget, and core all the flues ; to put to the kitchen fire-place a chimney-bar of wrought-iron $3\frac{1}{2}$ inches by $\frac{5}{8}$ inch, and to put to each of the other fire-places a chimney-bar of wrought-iron $2\frac{1}{2}$ inches by $\frac{1}{2}$ inch; each chimney-bar is to be properly corked at the ends thereof.

To put to each of the fire-places a trimmer of half brick-work 18 inches wider than the chimney-opening.

Copper, &c. To provide and set in the scullery with fire-bricks, strong wrought-iron furnace-bars, door, and frame, and all other proper appurtenances, a strong washing-copper of the size shown by the plan.

Tile cresting, &c., in cement. To finish the party-walls, chimney-shafts, parapets, and other walls which are not intended to have stone copings, with double plain tile cresting and brick-on-edge, both set in and jointed with cement and clean Thames sand mixed together in equal measures.

To finish the gable over the south side of the principal roof with stepped salient-courses as shown by the drawings.

Indents. To cut and parget where requisite in the old brick-work proper perpendicular indents, to receive the intended new brick-work, and to make good in a workman-like manner all damage caused by cutting the indents.

Cutting. To cut and rub all such splays and chamferings as may be requisite in order to complete the building according to the drawings, except where such splays and chamfers are described to be in moulded bricks.

Bedding. (See p. 77).

Cross walls. To build cross walls, as shown by the drawings, under the timber-floor of the back part of the shop, and under the quartered-partition between the stable and the chaise-house; the upper four courses of work under the said quartered-partition are to be set in cement and clean Thames sand mixed together in equal measures.

Brick paving. To pave with hard stock-bricks laid flat in mortar and grouted also between the joints with liquid mortar, the stable, the chaise-house, and the whole of the basement-story, including the areas.

(The basement-story of this house was devoted to cellarage).

Brick-nogging. To brick-nog with half brick-work the quartered-partition between the stable and the chaise-house.

To brick-nog with bricks set on edge the whole of the quartered-partition on the south side of the principal staircase, and the quartered partitions at the back of the recess in the best room on the one-pair story, and that on the east side of the water-closet lobby.

Drains, &c. (See p. 77). The main drain to be 6 inches diameter.

Reparation, &c., of old South party-wall. To repair, make good, render as uniform as possible, and flat-joint-point with stone-lime blue mortar to the height of 19 feet from the ground, the portion which is not intended to be rebuilt of the North party-wall of the house.

10 cwt. iron-hooping. To provide and work up in the chimneys, and other brickwork, 10 cwt. of wrought-iron vat-hooping.

2 rods extra brick-work. (See p. 78).

Bricks. (See p. 78).

Samples. (See p. 78).

Mortar. (See p. 78).

Mode of doing the work. (See p. 78).

Lime-whiting, &c. All the interior work of the basement-story, of every part of the shop, of the stable, the chaise-house, and the loft, is to be finished completely fairly, and is to be twice lime-whited.

To lime-whiten twice also the unplastered timbers and boarding of the underside of the one-pair flooring, and of the leaded flat, and also of the basement flooring. (The ground story was to be used principally as a warehouse).

Iron curb and railing. To inclose according to the drawings the leaded flat over the loft, along the front parapet thereof, with cast-iron curb, wrought-iron rail, $2\frac{1}{2}$ inches by $\frac{1}{2}$ inch, wrought-iron standards 1 inch square, and cast-iron bars $\frac{3}{4}$ inch square, fitted up, fixed, run with lead, and made complete. (The iron-work is not separated from the other works in this specification).

Scaffolding. To provide and fix all scaffolding which may be requisite for the performance of the whole of the works of every kind, including the plumber's work of the intended dwelling-house, and of the offices and appurtenances thereof, with sufficient poles, putlogs, boards, ladders, and other things proper and requisite thereto.

Jobbing-work. (See p. 79).

MASON.

Granite sill. To put along the principal front, under the story-posts and iron-columns, two pieces of parallel square Aberdeen granite curb scantling 12 inches by 9 inches each, feet, inches long, fine worked where in sight, and cut out to receive the bases of the columns and story-posts.

Steps. To put to the four external doorways of the dwelling-house, the best tooled solid Yorkshire stone steps, 7 inches by 13 inches properly back-jointed, with

mortise holes to receive the bottoms of the door-posts, and with the projecting corners rounded off, as shown by the plan.

Stone dressings.

(See p. 80).

Window-sills.

To put to the two front windows over the gateway, sunk, weathered, and throated sills of Portland stone, scantling 4 inches by 9 inches.

To put to all the other windows of the dwelling-house and offices, sills of 3 inch Yorkshire paving-stone wrought with fair edges and ends, throated, and laid sloping, (See p. 80).

Cornice coping, &c.

To execute the level and raking cornice, inclosing the pediment of the principal front of the dwelling-house according to the drawings, of Portland stone scantling, 18 inches by 5 inches, with proper raised sunk water-joints, channelled and run with lead, and with solid apex and angle stones, the sunk bed-moulding to be mitred round each block or truss; to put under the same brick blocks or trusses, and a plain throated and weathered string-course of Portland stone, 3 inches by 6 inches; and to put to the parapet above the gateway Portland stone coping scantling 15 inches by 3 inches, throated and run with lead at the joints therein.

Landing under water-closet, &c.

To provide and fix for the support of the water-closet and the lobby thereof a piece of the best tooled Yorkshire stone-landing, 8 feet 6 inches long, 3 feet 6 inches wide, and $3\frac{1}{2}$ inches thick, wrought with fair and chamfered outer edges, and with the projecting angle thereof rounded to the shape of the water-closet.

Chimney-pieces, &c.

To put to the principal kitchen chimney jambs and mantle, each of 2 inch Portland stone, 10 inches wide.

To put to the scullery chimney, and to the chimney of the lesser kitchen, jambs and mantles, each of 2 inch Portland stone, 6 inches wide.

To put to the best room on the one-pair story a chimney-piece, p. c., £15.

To put to each of the four other fire-places in the

north party-wall of the dwelling-house a chimney-piece, p. c., £2.

To put over the chimney-bar of each of the same four fire-places a piece of 4 inch Yorkshire stone, 7 inches wide, 3 feet 6 inches long, and chamfered away at the back, so as not to check the ascent of the smoke.

To put to all the remainder of the fire-places jambs, mantles, and shelves, each of $1\frac{1}{4}$ inch Portland stone, 6 inches wide.

Setting. (See p. 80).

Hearths and slabs. To put to the whole of the fire-places hearths of $2\frac{1}{2}$ inch rubbed Yorkshire stone.

To put to all the fire-places hearths of 2 inch Portland stone.

To provide and fix under the copper a hearth of 3 inch Yorkshire stone containing 12 feet superficial.

Paving to small yard and privies. To pave the two privies and the small yard adjoining thereto each with one piece of $2\frac{1}{2}$ inch Yorkshire stone.

Floor-landing to passage. To put to the entrance-passage on the south side of the gateway a floor of 3 inch tooled Yorkshire stone, let into the brick-work in pieces as large in size as possible.

Make good public paving. To pay to the commissioners of paving the expense of making good the paving which will be injured or disturbed by the execution of the intended works.

Sinks. To provide and fix in the scullery and small kitchen two sinks as shown by the plan, of Yorkshire stone 7 inches thick, with proper bearers, and with holes cut out for the pipes and traps.

Jobbing-work, &c. (See p. 81).

SLATER.

Countess slating. (See p. 81).

Bond, &c. (See p. 81).

Reparation. (See p. 81).

CARPENTER, JOINER, SMITH, AND IRONMONGER.

New materials, &c. To provide sufficient new materials for, and frame, fix, and finish all carpenter's work and joiner's work, which may be requisite for carrying into effect, and for completing in every respect the intended dwelling-house, and the offices and appurtenances thereof, according to the design.

Ironmongery, &c. (See p. 82).

Timber and deal. (See p. 82).

Old timber. Any portion of the old timber at present on the premises which may remain sound and good, and of the proper description according to the specification, may be used in the new work.

Hoarding. To provide and fix strong hoarding, sufficient to inclose the ground during the time the work is being carried on.

Shoring. (See p. 83).

Sundries. (See p. 82).

4 cwt. iron ties, &c. To provide and fix in and about the intended building, 448lbs. avoirdupois of wrought-iron in such straps, ties, screw-bolts, and other light, wrought and hammered work, as the architect may direct; all additions to the said quantity, and all deductions therefrom, are to be taken after the rate of per pound avoirdupois, including the fixing thereof.

Centering. (See p. 82).

Wood-bricks. To put all wood-bricks requisite for fixing the skirtings of the ground story, and for receiving the other finishings and works so requiring.

Lintels. To put over the window of the principal kitchen a lintel extending from the North party-wall, of fir 18

feet 10 inches long, scantling, 9 inches by 9 inches, with a return of similar sized timber, 7 feet long, halved thereto, and extending round the South-side of the staircase.

To put over the window of the room above the principal kitchen a lintel of fir, 13 feet long and 9 inches square.

Lintels.

To put over the openings in the building lintels and filling-in-lintels wherever else requisite, each 5 inches high, 18 inches longer than the bearing, and of the width of the brick-work.

(See p. 83).

Ground-flooring.

To construct the ground-flooring according to the drawings, with six fir girders, each 18 feet 6 inches long, and scantling, 10 inches by 8 inches,—five oak sleepers or plates, and oak side wall-plates under the girders, 4 inches by 4 inches, and fir joists, 7 inches by by $2\frac{1}{2}$ inches; and to lay the whole of the timber-floor of the ground-story with $1\frac{1}{2}$ inch deal rough boards, clear of sap-wood, ploughed and tongued, with wrought-iron $1\frac{1}{4}$ inch by one-sixteenth inch; a portion of the shop-flooring is to be ledged, and to be hung with strong joints and flush rings, in order to form a pair of large folding trap doors.

For the heads of timbers which are to be inserted in the damp brick-work, which lies near the ground, sockets of cast-iron are to be recommended.

Breast-summers, story-posts, columns, &c.

To put under the girders of the ground-floor six fir-framed and chamfered story-posts, 6 inches square, each with York stone corbel, 6 inches by 6 inches, and 2 feet 6 inches long; and a box socket of cast-iron $\frac{3}{8}$ inch thick, extending 9 inches high up the post, and with an iron plate-base cast thereon, 15 inches square, with a rim extending all round 2 inches down over the brick pier.

To put for the support of the front and back walls of the dwelling-house, fir breast-summers scantlings, 15 inches by 13 inches; the breast-summers over the gateway being cut away 3 inches to the form of an arch,

to put under the front of the gateway two fir story-posts, 9 inches by 13 inches: to put under the back of the gateway two fir wrought story-posts 6 inches by 13 inches, and two oak wrought and shaped corbels 13 inches by 9 inches, and 2 feet 6 inches long; to put at the ends of the shop-front two fir story-posts, 4 inches by 12 inches. To put by the front shop-doorway a fir story-post, 9 inches by 3 inches.

To put over the window and the door on the South-side of the shop a fir wrought breast-summer, 12 inches by 12 inches.

To put to each of the story-posts on the ground-floor a cast-iron socket-base of metal, $\frac{3}{8}$ inch thick, and 10 inches high.

Cast-iron columns.

To provide and fix the following columns of cast-iron.

Three under the shop-breast-summer, each $4\frac{1}{2}$ inches diameter at bottom, and 4 inches diameter at top.

One column 4 inches square for the support of the breast-summer, inserted in the brick-work of the counting-house-chimney.

And one column $3\frac{1}{2}$ inches square for the support of the back front above the scullery.

To put to the iron columns, bases and capitals, as shown by the drawings.

One-pair floors.

To construct the one-pair flooring with five fir wrought girders, scantlings 12 inches by 6 inches and 18 feet 6 inches long, with fir wrought joists 5 inches by $2\frac{1}{2}$ inches corked thereon, and trimmers and trimming-joists 5 inches by 3 inches; two fir wrought girders over the gateway, 10 inches by 9 inches, and 13 feet 9 inches long, with fir joists 7 inches by 2 inches corked thereon, and trimmers and trimming-joists 7 inches by 2 inches; to lay the whole of the one-pair story with inch-wrought yellow clean deal boards, clear of sap-wood, and grooved and tongued to the part over the shop, with wrought-iron, $1\frac{1}{4}$ inch by one-sixteenth inch.

Loft-floor.

To construct the loft-floor with joists 5 inches by 2 inches; and trimmers and trimming-joists 5 inches by $2\frac{1}{2}$ inches and to lay the same with inch yellow deal, clear of sap-wood.

Floor to the water-closet, &c.

To lay to the water-closet, and to the lobby thereof, inch clean batten floors, on sufficient furrings or bearers.

Two-pair and attic floors.

To construct the floorings of the two-pair story and of the attic story, with joists 12 inches by $2\frac{1}{2}$ inches, and trimmers and trimming-joists 12 inches by $2\frac{3}{4}$ inches; and to lay the whole of the two stories with inch yellow deal half boards, listed clear from sap-wood.

Wall-plates and templets

To put to all the floors above the ground-story the requisite wall-plates of fir scantling, 5 inches by 4 inches, continued all round the walls at the one-pair, two-pair, and three-pair stories, except where the flues occur; and to put under the ends of the girders and other principal timbers the requisite templets each of fir 2 feet 6 inches long, and scantling 6 inches by $4\frac{1}{2}$ inches.

Roofs over the low buildings.

To construct the roof over the western part of the shop with wall-plate 5 inches by 4 inches, one wrought gutter-plate 12 inches by 8 inches, one wrought gutter-plate 12 inches by 3 inches, wrought blocks framed between the two gutter-plates, wrought joists 9 inches by 2 inches, laid to a current, wrought trimming-joists against the party-wall 9 inches by 2 inches (the brick-work being corbeled out beneath the same), inch yellow deal boarding for lead, clear of sap-wood, and with rolls for the lead.

To construct and fit up the flat over the loft, with wall-plate 4 inches by 4 inches, fir joists 8 inches by 2 inches, laid to a current, trimming-joists against the west wall 8 inches by 2 inches (supported upon brick-work corbeled out), gutter-plate 8 inches by 3 inches, with framed bearers and inch deal boarding for lead, with rolls as described to the flat last mentioned, and to put along the northern side of the same flat a strong guard-rail with sufficient standards.

Roofs to water-closet and scullery.

To put over the scullery a roof with fir joists 5 inches by 2 inches, laid to a proper current; to put

over the water-closet and the lobby thereof a roof with joists $3\frac{1}{2}$ inches by 2 inches, and to lay both the same roofs with inch yellow deal, clear of sap-wood, with rolls for lead.

Minor roofs over the gateway, &c.

To construct the lower roofing over the three-pair story, according to the drawings, with wall-plates 4 inches by 4 inches, diagonal ties and dragon-pieces 4 inches by $2\frac{1}{2}$ inches, rafters 4 inches by 2 inches, frames to the sky-lights 5 inches by 3 inches, ridges 8 inches by 1 inch, valley-pieces $2\frac{1}{2}$ inches by 6 inches, braces to the rafters below the curb-plate 4 inches by $2\frac{1}{2}$ inches, and slate battens $2\frac{1}{4}$ inches by 1 inch. To put over the stair-case, a 2 inch yellow deal sky-light, with inch deal beaded linings, and all other requisite fittings and appurtenances complete.

Upper or principal roof.

To construct the upper principal roof with wall-plates 5 inches by 4 inches, rafters to the small lean-to roof 3 inches by 2 inches, other rafters and curb-rafters 5 inches by 2 inches; two braces to the curb-rafters 4 inches by 3 inches, rounded ridges and hips 8 inches by 1 inch, valleys $2\frac{1}{2}$ inches by 8 inches, four angle ties each 4 feet long, four dragon-pieces 4 inches by $2\frac{1}{2}$ inches, slate-battens $2\frac{1}{4}$ inches by 1 inch, four binders, each running in one piece from east to west, scantling 10 inches by 3 inches, and ceiling joists spiked each in one length below the binders $2\frac{1}{2}$ inches by 2 inches, and fixed with proper fillets at the ends thereof.

Dormer.

To put in the south quartered-partition at the head of the principal stair-case, an upright $1\frac{1}{2}$ inch bead-butt and square two-panel dormer-door, with $1\frac{1}{4}$ inch rebated and beaded linings, and hung with strong hinges and bolt; and to form the heads of the two dormer-windows, with frame-work and fittings complete.

Gutters, &c.

To lay to the several roofs inch yellow deal gutter-boards, on strong fir-bearers, with current $1\frac{1}{2}$ inch to every 10 feet, $2\frac{1}{2}$ inch drips in the situations shown by the plans, and cess-pools to the heads of the rain-water-pipes: to put to the gutters and valleys the requisite $\frac{3}{4}$ inch yellow deal lear-boards 10 inches wide.

Quartered-partitions.

To construct the quartered-partitions between the back-rooms and front-rooms, with heads 6 inches by 5 inches, ties above the doorways 4 inches by 5 inches,

queens above the ties 6 inches by 5 inches, four posts to each story $3\frac{1}{2}$ inches by 5 inches, upper and lower braces or struts $3\frac{1}{2}$ inches by 5 inches, quarters 5 inches by 2 inches, and inter-ties not more than 2 feet 6 inches apart 2 inches by 1 inch.

To construct the quartered-partitions on the South side of the principal staircase with bottom-sill and heads 6 inches by 5 inches, kings 4 inches by 5 inches, struts 4 inches by 3 inches, quarters 5 inches by 2 inches, not more than $13\frac{1}{2}$ inches apart, and inter-ties not more than 2 feet apart; scantling 5 inches by 1 inch.

To construct the quartered-partitions on the North side of the principal staircase, with top and bottom plates 4 inches by 3 inches, ties above the doorways 4 inches by 4 inches, queens above the ties 4 inches by 5 inches, struts or braces above and below the ties $3\frac{1}{2}$ inches by 3 inches, door-posts 4 inches by 3 inches, quarters, 4 inches by 2 inches, and inter-ties not more than 2 feet 6 inches apart; scantling 2 inches by 1 inch.

To construct the partition between the stable and the chaise-house with oak bottom plate $4\frac{1}{4}$ inches by $3\frac{1}{2}$ inches, fir upper plate $4\frac{1}{4}$ inches by 4 inches, king-post $4\frac{1}{4}$ inches by 5 inches, struts $4\frac{1}{4}$ inches by 3 inches, quarters $4\frac{1}{4}$ inches by 2 inches, and inter-ties $4\frac{1}{4}$ inches by 1 inch.

To provide and fix the other requisite quartered-partitions with top and bottom plates, and posts, and braces 4 inches by 3 inches, quarters 4 inches by 2 inches, and inter-ties not more than 2 feet 6 inches apart, 2 inches by 1 inch. (See p. 84).

Framed deal partitions.

To fill in the arched opening in the wall on the South side of the gateway with 2 inch deal partitioning framed bead-flush on both sides.

To divide off the rooms from the lesser staircase, and to divide off the other parts of the premises as shown by the drawings by 2 inch deal square-framed partitions with neat door-stops and with $\frac{3}{4}$ inch deal panels, neither glued, nor more than 10 inches wide. The partitioning of the counting-house is to have the upper part thereof formed with ovolo sashes therein.

Cradling, &c. To form out properly with strong yellow deal ribbed cradling for the plasterer the ceiling of the best room on the one-pair story, and the ceiling of the lobby to the water-closet.

Doors, &c. To put to the side-entrance under the gateway a 2 inch four-panel moulded and bead-flush door, hung with a pair of 4 inch butt-hinges, a 10 inch best draw-back iron rimmed lock with key and strong plain brass furniture, and two 10 inch barrel-bolts, in a fir proper door-case 4 inches by 5 inches, with a transom 4 inches by 3 inches; and to fit up the front doorway on the South side of the gateway in all respects the same as the doorway last described, except that the back of the door is to be bead-butt; and to put round the outside of the same doorway a deal moulded architrave, according to the drawings.

To fit up the principal entrance of the shop with 2 inch folding-doors, as shown by the drawings, framed in three leaves, hung with hinges, lock, and six bolts, of the same description as those last described for the other doors.

To fit up the side doorway of the shop, next the yard, with a pair of 2 inch folding sashed doors with $1\frac{1}{4}$ inch bead-flush and square panels, $1\frac{1}{4}$ inch bead-flush and square shutters with corner shoes, dogs, and sockets, and strong screw fastenings, all of wrought-iron, and hung with lock hinges and four bolts, the same as to the front doors, in fir proper door-case 5 inches by 6 inches, with transom 5 inches by 3 inches.

To put to the stable and to the loft inch deal ploughed, cross-tongued, beaded, and strongly ledged doors, hung with strong cross-garnet hinges in fir door-cases 5 inches by 5 inches; to put to the loft-doorway two 10 inch rod-bolts, and a 2 inch oak rounded threshold 12 inches wide; and to put to the stable doorway a 9 inch copper-warded stock-lock, a Norfolk thumb-latch, and a transom 5 inches by 3 inches, with wrought-iron bars 1 inch square, and not more than 4 inches apart above the same.

To put to the best front-room on the one-pair story a $2\frac{1}{2}$ inch four-panel door, moulded on both sides, and hung with a pair of 4 inch butt-hinges, and a best strong mortise-lock, with plain strong brass furniture.

To put to the best front chamber on the two-pair story a 2 inch four-panel, moulded and square-framed door, hung with hinges and lock, the same as to the door last described.

To fit up all the doorways of the remainder of the dwelling-house and offices with 2 inch four-panel deal square-framed doors, with $\frac{3}{4}$ inch deal panels hung with 3 inch wrought butt-hinges, and with best 7 inch iron rimmed locks with keys, and the best plain brass furniture complete. The upper panels of the door to the smaller kitchen, and of the chamber over the same, are to be left out, in order that ground glass may be put thereinto, instead of deal; and the door of the counting-house is to be sashed.

Door-linings, &c. To put to all the doorways in the walls and quartered-partitions $1\frac{1}{4}$ inch deal single-rebated linings; to put to all the doorways in the walls and quartered-partitions of the one-pair and two-pair stories (except next the inside of the scullery) inch deal framed and beaded grounds; and to put round on both sides of the doorways of every description throughout the house (except to the closets adjoining to the minor staircase) mouldings to form architraves, according the drawings.

Gates &c. To construct the front gates according to the drawings, moulded out of the solid, with 3 inch deal stiles and rails, 2 inch deal muntins, $\frac{3}{4}$ inch deal panels, inch deal braces, and large grooved and moulded capping with neat wrought-iron spike-heads on the top thereof, and to hang the pair of gates with hinges and fastenings value £6., exclusive of the expense of fixing.

To case the front breast-summer, and the story-posts of the gateway and side doorway adjoining thereto, all over with inch yellow deal rebated and beaded; and to put over the gateway and the side-door adjoining thereto a moulded fascia as shown by the drawings.

To put to the chaise-house a pair of inch deal, strongly ledged, ploughed, cross-tongued, and beaded gates, hung with hinges and fastenings, value 30*s*. exclusive of the expense of fixing.

To put to the front of the stable and chaise-house

a wrought and rebated door-head of fir 9 inches by 6 inches, and two wrought and rebated posts 9 inches by 4 inches, with cast-iron socket-bases of metal $\frac{3}{8}$ inch thick, and forming a cube 9 inches by 6 inches and 9 inches high.

Closets and pantry.

To construct the closets according to the drawings, with 2 inch deal square-framed inclosures, with $\frac{3}{4}$ inch deal panels not more than 10 inches wide (except where the drawings show the inclosures to be of quartering), $1\frac{1}{2}$ inch deal four-panel square-framed closet doors with $\frac{3}{4}$ inch deal panels, hung with 3 inch butt-hinges, and strong 5 inch iron rimmed locks, with strong brass furniture.

Shelves

To put in the pantry and in each of the closets three tiers of inch deal shelves of the several widths shown by the plans, the lower shelves being in some instances of extra width as thereby shown, and the whole being securely fixed upon proper strong bearers; and to put over each of the two kitchen chimneys a shelf of $1\frac{1}{4}$ inch deal 8 inches wide, fixed upon strong cut brackets.

Skirtings.

To put round the best front-room on the one-pair story moulded skirting 12 inches high according to the drawings.

To put round the best front-room on the two-pair story inch plain moulded skirting 9 inches high.

To fit up every other part of the dwelling-house (the shop and the basement-story thereof excepted) with inch square skirting 8 inches high.

Skirting grounds, &c.

The whole of the skirtings are to be fixed with ploughed grounds and the requisite backings.

Balconet.

To provide and fix before the Venetian window, a balconet according to the drawings, with wrought-iron rails and standards, to detail.

French casements, &c., &c.

To fit up the Venetian window of the best room on the one-pair story with fir proper frame 5 inches by 4 inches, with muntins, English oak sunk sill, and $2\frac{1}{2}$ inch lamb's tongue sashes and French casements, hung with 4 inch brass butt-hinges, and with fastenings value 7*s*.

To put to the window of the principal kitchen and to the window of the scullery 2 inch folding bead-flush and square-framed sashed doors, hung in fir proper door-cases 5 inches by 4 inches, with oak sills $4\frac{1}{2}$ inches by 4 inches, and with $1\frac{1}{4}$ inch bead-flush and square-framed shutters, with wrought-iron dogs, sockets, corner-shoes, shutter-lifts, and thumb-screws; and a transom and an $1\frac{1}{2}$ inch ovolo sash to be placed over the sashed-doors of the kitchen.

Fan-lights, &c.

To provide six similar sashes or fan-lights of cast-iron according to the drawings, and to fix the same in and over the folding-doors of the shop-front.

To put over all the other external doorways $1\frac{1}{2}$ inch deal fan-lights according to the drawings.

Other windows.

To fit up all the other windows of every kind throughout the building with $1\frac{1}{2}$ inch ovolo yellow deal sashes, double-hung with the best large patent lines, iron weights, iron axle-pulleys, and patent spring fastenings, in deal cased frames, with English oak sunk sills. The upper sash of the pantry is to be filled in with strong copper fly-wire, and the sills of the windows to the water-closet and to the lobby thereof are to project 3 inches, and to be throated.

Shop front.

To construct and fit up the shop-front according to the drawings with inch Honduras mahogany fascia, two cast-iron pateras to pattern, a pair of carved trusses, moulded cornice with enrichments of cast-iron, 1 inch deal moulded pilasters with moulded capitals, $1\frac{1}{2}$ inch deal pedestals, $1\frac{1}{2}$ inch plinths and moulded imposts, 1 inch deal linings to the pilasters, story-posts, and breast-summer, turned oak balusters, 2 inch deal stall-boards, $2\frac{1}{2}$ inch deal ornamental sashes, 2 inch deal square-framed one-panel backs behind the balusters and under the stall-boards, and all other requisite fittings, bearers, furrings, linings, dressings, and appurtenances complete.

To put to the side-windows and to the three leaves of the door of the shop-front $1\frac{1}{4}$ inch deal moulded and bead-butt shutters according to the drawings, with strong wrought-iron corner-shoes, dogs, and plates, sunk shutter-lifts, and strong wrought-iron, bars with pins, staples, dogs, and all proper fittings and appurtenances.

Folding shutters.

(For folding shutters see p. 99).

Other window-fittings.

To fit up all the remainder of the windows throughout the dwelling-house and offices with $1\frac{1}{4}$ inch deal tongued linings, finished so as to form double-quirked beads to the stucco.

Area-gratings.

To provide and fix over each area a cast-iron grating with bars $1\frac{1}{2}$ inch by $\frac{3}{4}$ inch not more than $1\frac{1}{2}$ inch apart, frames $1\frac{1}{2}$ inch by 1 inch, and with strong flanges let into the paving and brick-work.

The frames of flat area-gratings are best made of cast-iron about 3 inches deep and rebated so as to extend all round under the paving.

Window-guards.

To put to the lower two windows adjoining to the principal staircase and to the window of the counting-house guards of wrought-iron with bars 1 inch square not more than 4 inches apart, and with frame-work of iron of the same substance securely fixed to the brick-work.

Staircase.

To construct the principal staircase according to the drawings, with $1\frac{1}{4}$ inch best clean deal risers, steps, and landings with moulded returned nosings, $1\frac{1}{4}$ inch beaded cut and mitred string-boards, $1\frac{1}{4}$ inch wall-strings, strong bracketed carriages, best large moulded Spanish mahogany hand-rail, strong square bar dove-tailed balusters (each tenth baluster being of wrought-iron), turned and framed newels, and all requisite inch deal apron-linings, and all proper blockings and other fittings complete.

To construct the minor staircase with $1\frac{1}{4}$ inch deal treads landings and risers housed into 2 inch string-boards and wall-strings, and deal moulded hand-rail, but in all other respects as described for the principal staircase.

To construct the two flights of basement-stairs, with $1\frac{1}{2}$ inch rough oak treads housed into 2 inch rough oak strings, and to put at the sides of the stairs strong deal rounded guard-rails with chamfered newels and diagonal braces.

To provide and fix a wrought and dove-tailed

Cistern (if of lead).

2 inch deal cistern-case,
feet inches long,
feet inches wide.
feet inches deep,
internal dimensions; and to put thereto all requisite bearers and other fittings, and also a $\frac{3}{4}$ inch deal cover strongly ledged and with saddle-backed fillets and four water-channels to each joint.

Water-closets.

To fit up the water-closets with inch clean deal seats, risers, and clamped flaps and frames; to provide all requisite bearers and other fittings; to attend upon the plumbers while fixing the pipes and apparatus; and to cut all requisite pipe-holes.

To provide and fix neat inch deal casings for the pipes of the water-closet, with rebated and beaded grounds, butt-hinges, and brass buttons.

Dresser, &c.

To put in the back kitchen a dresser with two drawers, three sunk shelves, standards, pot-board and bearers, together in value £4; and to put in the scullery $1\frac{1}{2}$ inch deal clamped dresser-top, hung with strong hinges, rule-joint, and moveable bracket-bearers.

Stable fittings.

To fit up the stable with approved patent stable fittings, fixed complete; to form in one angle of the stable a step-ladder to ascend to the loft; and to put in the stable-paving a cast-iron strong trapped grating 12 inches square.

Dust-bin.

To provide and fix in such situation as shall be directed a dust-bin with inch yellow deal sliding trap-door and top, with hinges, timber-work, and all proper appurtenances complete.

Grates.

To provide and set to the bed-room, grates,

			average price	£1	0	0
„	„	best room	„	4	10	0
„	„	kitchen range	„	10	0	0
„	„	scullery do.	„	5	0	0

Ladders.

To provide a strong step-ladder for ascending from the upper landing of the principal staircase to the side dormer, and to provide a strong oak step-

ladder for ascending from thence to the principal roof; and to provide a similar oak step-ladder for ascending from the leaded-flat over the shop to the leaded-flat over the loft, with a strong guard-bar and standards at the side thereof.

25 cubic feet of fir extra.

(See p. 89).

Jobbing-work.

(See p. 89).

PLASTERER.

L. P. F. S. and W.

To lath, plaster, float, set and whiten ceilings and strings to every part of the intended dwelling-house except to the basement-story and to the shop thereof.

Cornice, &c., &c.

To run and execute round the drawing-room and round the principal staircase, cornices (here mention the girths of the several cornices, in inches, and also describe the enrichments, if any).

Stucco.

To execute in the very best floated and troweled stucco fit for painting, every part of the sides of all the rooms, staircases, closets, and every other part of the interior of the dwelling-house and counting-house (except of the basement-story and shop).

The whole of the quarters and furrings are to be lathed.

Beads, quirks, and sundries.

To run and execute all requisite beads, quirks, and arrises; to perform such dubbing out, and to make out and form such additional thicknesses to the plastering as may be found requisite; and to counter-lath all such parts of the work as may so require in order to afford a proper key to the work.

CHAPTER IV.

A SPECIFICATION *for erecting and completely finishing fit for occupation a new* PUBLIC-HOUSE AND DWELLING-HOUSE *of building, at the corners of street and according to the drawings signed with and forming part of the contract for the performance of the work, and under the direction of the architect appointed to superintend the same.*

BRICKLAYER.

Notice, &c., to district-surveyor, &c.

To give to the district-surveyor or other public officer, and to all other public officers, the requisite notices, and to pay to the whole of them their proper fees and official charges. (See p. 75).

Digging, &c.

To perform all requisite digging of every kind for the foundations, drains, and other works; to fill in and make good the ground to all the foundations; to remove and cart away all rubbish, superfluous ground, and useless matters of every kind, arising from the performance of the various works, and finally to leave the whole of the house and premises clear therefrom: the ground is to be wholly taken out to the depth of 11 feet 6 inches beneath the timbers of the floors of the kitchen and back part of the parlour. (See p. 75).

To bale out, draw off, or pump away, and remove all water and soil which may come into the foundation from springs, currents, drains, cess-pools, rain, or otherwise; and to make good all damage from accident or other cause which may occur during the laying of the foundations as well to the works of the intended new building, as also to the neighbouring premises therewith connected.

Water.

(See p. 75).

Concrete.

(See p. 75).

Repairs and alterations to old brick-work.

To repair thoroughly, with the requisite new bricks, and make good the old south wall of the basement-story, and to rake out the mortar joints there-

from, and point the whole of the same wall with stone-lime blue coal-ash mortar.

To repair thoroughly the brick-work of the kitchen-building, to cut out for and make good to the two windows intended to be inserted therein, and to repair and make good the kitchen-chimney.

Repairs to adjoining brick-work.

To repair in a workman-like manner all damage which may be occasioned to any adjoining buildings by reason of the building and works of the intended new house.

General brick-work.

To execute all brick-work requisite in order to carry into effect the buildings according to the drawings, and to render the whole of the house and premises in every respect complete. (See p. 76).

Rough arches.

To turn rough arches where requisite; those of the back-front are to be flat-pointed.

Gauged arches.

To put to seven of the openings of the west-front gauged arches according to the drawings, cut in a close and accurate manner, and properly set.

Chimneys.

To properly turn, parget, and core all the flues; to put to each fire-place a 4 inch brick trimmer, 18 inches longer than the chimney-opening; to carry up the chimney-shafts as shown by the drawings, and to put over each flue a second-sized chimney-pot, set in tiles and Parker's cement.

Bedding, &c.

To bed in mortar all the plates, lintels, bond-timber, wood-bricks, stone-work, and all other things in or about the buildings which may so require; and to bed and point with lime and hair mortar all the window-frames and door-frames.

Piers under kitchen-floor, &c

To put beneath the sleepers of the kitchen-floor eight brick-piers 1 ft. 6 inches high and 9 inches square.

Brick-nogging to the privies.

To brick-nog the partition between the two privies.

Pavement of the basement.

To repair thoroughly the old pavement of the basement-story, using for that purpose such of the old bricks to be taken down from the present house as may be requisite for that purpose.

Drains. (See p. 77).

Facings. To face externally with the best second malm-stocks, matched of an uniform colour, the whole of the brick-work of the north-front of the house, and all that part of the west-front thereof which lies over the shop-front; all the other brick-work is to be faced externally with hard picked stock-bricks.

The north and west parapets are to have projecting fascias of brick-work 18 inches high, according to the drawings.

Extra brick-work. (See p. 78).

Bricks. All the bricks, except the malm facings, are to be new approved hard-burnt square grey stock-bricks, without any admixture of soft-bricks, place-bricks, or other inferior bricks.

Samples. (See p. 78).

Mortar. The whole of the mortar is to be compounded in the proportion of one-third by measure of the best Dorking stone-lime, and two-thirds by measure of sharp Thames sand properly beaten together.

Grouting, &c. The whole of the brick-work is to be flushed in at every course thereof with mortar, and is to be thoroughly grouted with liquid mortar at every alternate course, great care being taken in order that the outer faces of the work shall not be stained.

Mode of doing the work. No four courses of brick-work are to rise more than one inch, exclusive of the height of the bricks; all the external walls above ground are to be scrupulously carried up in Flemish bond, throughout their whole thickness, with all the heading bricks carried through both withinside and withoutside, in order to prevent excuse for the bad union of two different kinds of bond; all the other brick-work is to be laid in manner of English bond; all the joints of the work are to be neatly struck, and those on the outside thereof are to be drawn. (See p. 78).

Reparation of accidents, &c. All the walls are to be built level, except where otherwise directed; and should any damage occur to

the work by accident, settlement, or otherwise, during the time of the building, or during twelve calendar months thence after, the contractor is to make the same good as shall be by the architect directed.

Tile cresting, &c.

The whole of the walls which are not intended to have stone coping thereon, are to be finished with double plain-tile cresting and brick-on-edge, both set in and jointed with cement and Thames sand, mixed together in equal measures.

Jobbing-work.

(See p. 79).

MASON.

8 pieces of granite under iron-girders.

To bed in the brick-work of the basement-story eight pieces of granite street-curb, each 3 feet long, to receive the ends of the cast-iron girders of the ground-flooring.

Granite base to shop-fronts.

To provide and bed all along the two shop-fronts, and the circular corner connecting the same, a continuous base formed of new parallel square Aberdeen granite curb, 12 inches by 8 inches, dressed fair all round where in sight, and at the joints thereof, and plugged with lead: the granite base is to be continued so as to form a step to the side entrance doorway.

Six window-architraves.

To provide and fix the six window-architraves, according to the drawings, of the best Portland stone, in as few pieces as possible, plugged and cramped with copper, and fixed with sufficient bond-stones.

String-course.

To provide and fix beneath the windows of the two-pair story a weathered and throated string-course of the best Portland stone 6 inches high, 8 inches bed to the part forming the window-sills, and 6 inches bed to the other parts.

Window-sills.

To put to all the remainder of the windows Yorkshire stone weathered and throated solid quarry sills, $8\frac{1}{2}$ inches by $4\frac{1}{2}$ inches.

Coping.

To cover the parapets of the north and west fronts of the house with the best Portland stone coping 4 inches thick, moulded in front, chased out to receive the flashing, and with the joints plugged with lead.

Chimney-pieces, &c.

To put to all the fire-places $2\frac{1}{2}$ inch Yorkshire stone hearths, $1\frac{1}{2}$ inch Portland stone slabs 18 inches wide, and $1\frac{1}{4}$ inch Portland stone jambs, mantles, and shelves, each 6 inches wide.

Sink.

To put in the scullery a sink of Yorkshire stone 7 inches thick, as shown by the plan, and cut out for the waste-pipe and grating. (See p. 81).

Paving.

To pave the yard and the scullery with new Yorkshire stone, not less than $2\frac{1}{2}$ inches thick, worked quite fair on the edges through the whole thickness thereof, and laid in regular courses.

To put in the pavings of the yard a five-hole sink-stone.

Public paving.

To make good all the public paving (damaged or affected by the execution of the works) to the satisfaction of the surveyor to the Local Board, or defray to them the expense thereof as they may require.

SLATER.

To slate the roof of the principal building with the best countess slates fixed with zinc nails, and with cut heading-courses with bond as to the other parts of the work.

To repair in a satisfactory manner all damage which may occur to the work, and finally leave the same perfect at the rendering up of the whole building as complete.

CARPENTER AND JOINER.

Materials, &c.

To provide materials for, and frame and fix all carpenter's work and joiner's work of every kind (complete with ironmongery of the best quality) which may be requisite for carrying into effect and for finishing in every respect the house, buildings, and premises, according to the design, and in order to render the same complete and perfect.

Timber and deals.

All the oak timber is to be of English growth; all the other timber is to be either Dantzic, Riga, or Memel yellow fir; all the floors and joiner's work, and other wood-work, are to be of the best yellow Christiana

deal, except where herein otherwise directed; all the timbers and deal are to be cut out square, and perfectly free from the least sap-wood in any part thereof, and from shakes, large knots, and all other defects: none of the joists, rafters, ceiling-joists, or quarters, are to be respectively more than 12 inches apart.

Hoard. To erect and maintain sufficient hoarding for inclosing the ground while the building is being carried on, and to remove the same when so directed.

Wood-bricks. To put in the brick-work such wood-bricks as may be requisite for fixing the various finishings.

Centering. To provide, fix, ease, and finally remove when so directed, centering sufficient for all the openings, gauged and rough arches, and trimmers.

Sundries. To fix all the smith's work so far as connected with the carpenter's work. (See p. 82).

To provide and fix all requisite templets, lintels blocks, stops, linings, casings, fillets, tilting-fillets, beads, grounds, furrings, cappings, and other usual and appropriate fittings and finishings, proper and necessary for the carpenter's work and joiner's work; and to perform to the wood-work all needful grooving, beading, rebating, tonguing, framing, mitring, housing, and other proper work and labour.

Shoring. To shore up the ground all round the new building in a secure manner; and to provide, fix, maintain, and finally remove all shoring which may be requisite to the adjoining buildings, with the exception of the shoring requisite to the next house in consequence of the building of the new party-wall; the expense of which shoring is to fall upon the proprietor of the said next house.

Floor of ground story.

	Ins.	Ins.
Joists (laid on the iron girders)	6 by	$2\frac{1}{2}$
Trimmers and trimming-joists	6	3
2 sleepers of oak to the kitchen	5	3
2 cross plates under the parlour	4	$2\frac{1}{2}$

$1\frac{1}{4}$ inch yellow deal folding-floor of half boards, listed free from sap-wood, and rebated and fitted on the under side thereof.

2 steps to be formed in the passage leading to the yard, and the back outer door to have $1\frac{1}{4}$ inch oak tread.

To cover over the cellar-entrance with $1\frac{1}{4}$ inch oak, strongly ledged with oak, in a rebated oak frame 4 inches by 5 inches, with wrought-iron dogs and all other proper ironmongery.

		Ins.	Ins.
Other floors.	Wall-plates	4 by 3	
	Joists	10	2
	Trimmers and trimming-joists	10	$2\frac{1}{2}$
	Each floor with one tier of herring-bone struts down the middle thereof.		
	Inch white deal folding-floor of half-boards listed, free from sap-wood.		
Flat over ground story, &c.	Wall-plate	4	$2\frac{1}{2}$
	Joists	4	2
	Inch yellow deal boarding for lead upon proper furrings.		
	Breast-summer to receive the ends of the joists and the back front, in two thicknesses, bolted together with axiom fletch in the centre	12	6
	1 story-post under ditto	9	$4\frac{1}{2}$
	Inch deal tongued and beaded casing to breast-summer.		
Roof over attic story.	Curb-rafters	5	$2\frac{1}{2}$
	Circular framed plate to the curb rafters at the feet of the circular corner of the roof	5	3
	Curb-plate	5	4
	Upper rafters	4	2
	Ridge and one hip (rounded for lead) ...	1	$8\frac{1}{2}$
	Angle-ties (each 5 feet long)	4	$2\frac{1}{2}$
	Binders	9	3
	Ceiling-joists (spiked beneath the binders)	$2\frac{1}{2}$	$1\frac{1}{2}$
	Dormer with inch ledged tongued and beaded trap-door and outer trap-door and fittings complete, and with a step-ladder to lead out therefrom.		
	2 inch sky-light 6 feet long and 5 feet wide, with inch linings and all proper fittings complete.		
	Inch yellow deal gutter next the party-wall		

8 inches wide at the lower end, with current $1\frac{1}{2}$ inch to 10 feet, $2\frac{1}{2}$ inch drips, and $\frac{3}{4}$ inch deal lear-board 8 inches wide, $\frac{3}{4}$ inch yellow deal slate-battens 2 inches wide.

Breast-summers, shop-fronts, &c.

	Ins.	Ins.
Breast-summers framed and bolted together in two thicknesses, as described for ground floor	12 by 6	
2-end story-posts	9	$4\frac{1}{2}$

Inch deal tongued and beaded casings to breast-summer story-posts and iron columns.

$1\frac{1}{4}$ inch keyed frieze to show 2 feet wide.

Cornice with composition enriched ovolo and bead (or of cast-iron).

$1\frac{1}{4}$ inch plain pilasters with moulded capitals.

Framing between the pilasters according to the drawings, with $\frac{3}{4}$ inch panels with plain mitred margins $3\frac{1}{4}$ inches wide, $1\frac{1}{2}$ inch bottom rails $8\frac{1}{2}$ inches wide, $1\frac{1}{2}$ inch double-faced top-rails $6\frac{1}{2}$ inches wide, with large grooved and moulded capping, $1\frac{1}{2}$ inch styles and muntins 6 inches wide, with small capitals mitred round the tops thereof to form pilasters.

$1\frac{1}{4}$ inch three-panel bead-flush outside shutters, hung with large patent lines, brass axle-pulleys, iron weights, and screw-fastenings, complete in proper deal cased-frames.

$1\frac{1}{2}$ inch three-panel square framed internal window-backs.

2 inch lamb's-tongue sashes hung in frames complete, the same as the shutters.

Windows.

To fit up all the other windows of the premises with deal cased-frames with oak sunk sills and $1\frac{1}{2}$ inch ovolo sashes, double hung with iron pulleys and weights, large patent lines, and patent spring fastenings; the three windows of the ground story are to have $1\frac{1}{4}$ inch bead-flush and square outside shutters, hung complete with Redmund's rising and falling hinges, and two strong bolts to each window.

To put to the two dormer-windows 1¼ inch pilasters, and entabulatures and mouldings, and other dressings, as shown by the drawings.

Quartered-partitions

To provide and fix the quartered partitions as shown by the drawings, with

	Ins.	Ins.
Plates and posts	4 by	3
Quarters	4	2
Braces	3	3
One tier of inter-ties to each story	3	1

Framed partitions.

To divide off and inclose the rooms, passages, and other parts of the premises, as shown by the drawings, with 2 inch square framed deal partitions, with ¾ inch deal panels; the partitions of the parlour to be framed flush on the inside to receive canvas and paper-hanging.

Skirtings.

To skirt the whole of the premises with plain ¾ inch deal 6 inches high, plugged to the walls.

Dwarf wainscotting.

To put round the brick-work of the parlour, and round the brick-work of the tap-room, 1¾ inch square framed wainscotting, 4 feet high, with beaded capping and proper backings.

External doors.

To put to the three outer door-ways of the house 2 inch lamb's-tongue sashed-doors, hung in fir proper frames, 4 inches by 4 inches, the posts thereof let at bottom into the stone-steps, and with a socket of 4lbs. milled-lead to the foot of each post, and with inch tongued and beaded linings round each doorway: each door is to have also an inch bead-flush one-panel shutter, with wrought-iron dogs and corner-shoes and screw-fastenings complete.

The doors at the corner of the house are to be circular on the plan, to be moulded, and to be hung folding with Smith's patent spring hinges,—hinges and other ironmongery of 20s. value in addition thereto.

Each of the other doors is to be hung with a pair of Smith's patent spring hinges, a strong 8 inch iron rimmed lock, and two 9 inch barrel bolts.

The side entrance is to have 1½ inch circular fan-light with transome complete.

Other doors. To put to every other part of the premises $1\frac{1}{2}$ inch square framed four-panel doors, hung with 3 inch butt hinges and 7 inch mortise locks; two of the doors on the one-pair-story and two of the doors on the two-pair-story are to be sashed, in order to throw light on the staircase.

Door and window linings, &c. To put to the doors and windows the requisite inch deal, tongued, beaded, and double-quirked linings, and to put round the doors beaded and mitred stops and ogee mouldings.

Staircase. To construct the staircase from the ground-story upwards, according to the drawings, with $1\frac{1}{4}$ inch clean deal treads, risers, and landings, housed into 2 inch string-boards, strong turned and framed newels, deal moulded hand-rail, turned balusters, and all requisite linings and fittings complete.

To construct the staircase from the ground-story to the basement-story with $1\frac{1}{2}$ inch rough oak treads and strings framed together, and with a fir rail and a newel $3\frac{1}{2}$ inches by $3\frac{1}{2}$ inches. The head of the basement stairs is to be inclosed by a framed partition and a door, both the same as to the rooms.

Privies. To fit up the insides of the privies with $1\frac{1}{4}$ inch clean deal seats and risers on proper bearers, and inch deal clamped flaps and frames, the flaps hung with 2 inch brass butt-hinges.

Closet shelves. To provide and fix in the closets 50 feet superficial of inch deal shelves on proper bearers.

£40 other fittings. To put in the other parts of the premises such other fittings, to the value of £40, as may be by the architect directed.

Extra fir timber. (See p. 89).

Jobbing-work. (See p. 89).

SMITH.

4 rolled-iron girders. To provide and fix at the ground-floor four rolled-iron girders, each equal in weight to a solid scantling of cast-iron 8 inches by $2\frac{1}{2}$ inches.

5 cast-iron columns.

To provide and fix five cast-iron columns to support the breast-summers, each 4 inches diameter at bottom and $3\frac{1}{2}$ inches diameter at top, and with proper capitals, and also plates at top and bottom, each 12 inches square and $1\frac{1}{2}$ inch thick.

Chimney-bars.

To put to each of the fire-places a wrought-iron chimney-bar $2\frac{1}{2}$ inches by $\frac{1}{2}$ inch properly corked at the ends thereof.

	£	s.	d.
To furnish and set to the bed-rooms, grates average price, each	1	0	0
Best rooms	4	0	0
Kitchen range	7	10	0

224lbs. wrought-iron ties, &c.

To provide and fix 224lbs. weight of such ties, bars, bolts, and other wrought-iron work as may be requisite for the building; and if more or less than 224lbs. are required then a deduction or extra is to be allowed by the contractor; and he is to state in his tender the price per lb. for such iron-work.

PLASTERER.

L. P. S.

To lath with heart of fir laths, and plaster and set the curb-rafters and the whole of the ceilings, strings, and quartered-partitions above the basement-story.

Render and set.

To render and set the whole of the internal brick-work above the basement-story throughout the whole premises.

Colouring and whiting.

To whiten the whole of the ceilings and strings, and to colour the whole of the plastered sides of the premises, the plastering of the parlour excepted.

Cornices.

(See p. 127).

PLUMBER.

6lb milled-lead gutter.

To lay the gutter next the party-wall with 6lb. milled-lead turned up 5 inches high against the brick-work and 9 inches wide against the rafters.

6lb. milled-lead to flat.

To lay the small flat over the ground-story of the principal part of the house with 6lb. milled-lead with a roll down the centre, a gutter sunk 6 inches deep at one end, and the lead turned up 5 inches high all round the flat.

5lb. milled-lead to shop-fronts.

To cover the entablatures of the shop-fronts with 5lb. milled-lead turned up $4\frac{1}{2}$ inches high against the brick-work.

4lb. milled-lead flashings.

To put to the gutters, to the flat, and to the shop-fronts, flashings of 4lb. milled-lead 5 inches wide.

4lb. milled-lead to ridge and hip and to sky-light.

To cover the ridge and the hip of the roof with 4lb. milled-lead 16 inches wide, properly dressed and secured.

To put to the sky-light over the staircase 4lb. milled-lead flashings 15 inches wide.

5lb. milled-lead to dormers.

To cover the heads of the two dormer-windows and the top-sides and foot of the dormer-way out from the roof, with 5lb. milled-lead, turned and dressed 6 inches at the least over the slating.

5lb. milled-lead to curb roof.

To put beneath the bottom of the slating of the curb-rafters a flashing of 5lb. milled-lead 9 inches wide burnt into the stone coping.

(By this construction the principal evils of curb-roofs were avoided; the curb-rafters were made to pitch upon the wall-plate instead of casting the weight of the roof some way in upon the flooring, as is usual, and from which cause many houses are much injured; by this mode the usual narrow and dangerous guttering at the feet of the curb-rafters is altogether omitted).

Rain-water-pipes.

To put at the south-east angle of the house, a stack of 4 inch cast-iron rain-water-pipe, to lead from the lead-gutter at the top of the party-wall down to the gutter of the small leaded-flat, and from thence to the drain; and to put from the roof over the kitchen a 3 inch cast-iron rain-water-pipe; the whole of the rain-water-pipes are to be fixed with heads and shoes complete.

Eaves' gutter.

To put to the eaves of the roof above the curb-rafters 4 inch cast-iron guttering, fixed on strong wrought-iron brackets complete; the circular corner of the guttering is to be of copper.

Waste-pipe to sink.

To put to the sink in the scullery a 2 inch strong lead waste-pipe with a brass grating; the

end of the pipe is to be carried through the wall. (See p. 81).

W. C.'s, cisterns, and hot and cold water service.

(See pp. 105 and 106).

PAINTER.

To knot, stop, prepare properly, and paint four times with the best oil-colour the whole of the woodwork, iron-work, and other works of the whole premises which usually are painted a plain tint to choice.

GLAZIER.

To glaze with good ground glass the four sashed doors next the staircase, and to glaze with good second Newcastle crown glass the whole of the remainder of the sashes and lights of every kind above the ground-floor and other windows, except the ground-floor fronts. The whole of the glass is to be properly bedded, bradded, and back-puttied, and is to be cleaned and left perfect at the final rendering up of the premises as complete.

To glaze the windows of the ground-floor front with British plate glass of the best quality, properly bedded; and the size of the squares to be as shown on the elevations.

CHAPTER V.

FORM OF SPECIFICATION *to be inserted in an* AGREEMENT *for the* PURCHASING *of, or for* TAKING UPON LEASE, *a* HOUSE NOT YET FINISHED, *according to which specification the house is to be finished by the builder prior to the execution of the lease or conveyance.*

PARTICULARS *for finishing a house and premises situate on the west side of the Road from , the carcass of which house is already erected, being the most southern of three houses which are now being constructed by Mr. , at the southern extremity of a piece of ground which he holds of .*

ROOFS.

To take off the present covering of the roofs, to lay all the gutters of the premises with inch yellow deal gutter-boards and 6lb. milled-lead, as the case may be, with current $1\frac{1}{2}$ inch to every 10 feet run, and with $2\frac{1}{2}$ inch rebated drips; to batten all the roofs with $\frac{3}{4}$ inch yellow deal, and to slate the whole of the roofs with the best countess slates nailed with copper nails, pointed on the inside with stone lime-mortar with hair therein, and filleted with cement, cast-iron nails being first driven into the brick-work to secure the filleting.

ATTIC STORY.

To lay the floors with inch white deal (or yellow deal, as the case may be) clear of sap-wood; to fit up the windows with $1\frac{1}{2}$ inch yellow deal ovolo sashes glazed with second Newcastle crown glass, and double hung with large patent lines, iron weights, iron pulleys, and spring fastenings, in deal cased-frames with English oak sunk sills; to put round the windows $\frac{3}{4}$ inch tongued and beaded and quirked linings; to fit up the doorways with $1\frac{1}{2}$ inch yellow deal square-framed four-panel doors hung in $1\frac{1}{4}$ inch beaded and single rebated linings; to skirt the whole of the story with $\frac{3}{4}$ inch yellow deal, 6 inches high, plugged to the walls; to put ceiling-joists 3 inches by 2 inches spiked in one length beneath the binders of the roof. To

lath, plaster, float, and set the ceilings and quartered-partitions of the whole of the story; to render, float, and set all the brick-work, to whiten the ceiling, to colour the sides of the back-room and of the closets, and to hang the walls of the front-room and of the closet thereto attached with paper cut close, value —*d.* per piece.

TWO-PAIR STORY.

To lay the floors with inch white deal (or yellow deal, as the case may be) clear of sap-wood; to fit up all the windows with deal cased-frames with English oak sunk sills, and 2 inch yellow deal ovolo sashes glazed with second Newcastle crown glass, and double hung with the best large patent lines and iron weights and iron (or brass, as the case may be) axle-pulleys, and inch square-framed window-backs, and $\frac{3}{4}$ inch yellow deal window-linings; to provide and hang $1\frac{1}{2}$ inch yellow deal four-panel moulded and square-framed doors with $1\frac{1}{4}$ inch yellow deal double-rebated linings; to put inch yellow deal grounds, and also moulded architraves, round the windows, and on both sides of each door; to put to each room a Portland stone chimney-piece, with a slab of 2 inch Portland stone, wood (or stone, as the case may be) mantle-shelf and dressings, and a rubbed Yorkshire stone hearth; to put two closets in the front room with $1\frac{1}{4}$ inch square-framed (or moulded, as the case may be) fronts and doors with mouldings round the doors to correspond with the architraves, and with three shelves in each closet; to skirt the rooms and the closets with $\frac{3}{4}$ inch yellow deal 8 inches high, fixed with proper ploughed grounds; to lath, plaster, float, set, and whiten the ceilings; to run a plain cornice 8 inches girth round each room; to lath the partitions and to plaster, float, set, and hang with paper of the value of —*d.* per piece and border —*d.* per piece, all the sides of the rooms and closets.

ONE-PAIR STORY.

To lay the whole of the story with inch (or $1\frac{1}{4}$ inch, as the case may be) yellow deal floor clear of sap-wood; to fit up the windows with deal cased-frames, with English oak sunk sills, and 2 inch yellow deal ovolo sashes glazed with the best Newcastle glass, and double hung with large patent lines, brass axle-pulleys,

and iron weights, $1\frac{1}{4}$ inch moulded window-backs, elbows, and soffits, 1 inch bead-butt back-linings, and $1\frac{1}{4}$ inch moulded and square-framed shutters and back-flaps, hung with strong hinges, brass furniture, and strong spring shutter-bars complete, in $1\frac{1}{4}$ inch proper boxings, with mouldings to correspond with the door-architraves; to provide and hang 2 inch yellow deal four-panel moulded doors with the best mortise-locks with brass furniture, in $1\frac{1}{4}$ inch yellow deal double-rebated linings, with grounds and architraves on each side complete, as described to the two-pair story; to put round both rooms moulded skirtings 1 foot high, ploughed grounds and backings complete; to put a closet in the back-room the same as described for the two-pair story, moulded to correspond with the other joiner's work of this story; to put $2\frac{1}{2}$ inch rubbed Yorkshire stone hearths, a good chimney-piece in the front-room value £5, exclusive of the carriage and fixing, and a 2 inch Portland stone slab and a good Portland stone boxed chimney-piece in the back-room; to lath, plaster, float, set, and whiten the ceilings; to put a cornice round each room 15 inches girth, with enriched soffit and bed moulding; to lath the partitions, and to plaster, float, set, under-line with strong cartridge-paper and hang with figured paper value —*d.* per piece, and border value —*d.* per piece all the sides of the rooms and of the closets.

GROUND STORY.

To fit up the sides of the fire-places with four dwarf closets, with $1\frac{1}{4}$ inch moulded fronts and doors, inch Spanish mahogany moulded tops with mahogany skirtings over the same, and to put one shelf in each closet; to form folding-doors between the two rooms, to correspond in finishing with the other doors; to put in the rooms two good chimney-pieces, with Yorkshire stone hearths and Portland stone slabs, value altogether to the two chimneys £12, exclusive of the carriage and fixing; to put to the back parlour 2 inch yellow deal moulded French casements, hung in fir proper door-cases, with English oak sunk sills; and in other respects to fit up both rooms as described for the one-pair-story.

KITCHEN.

To put at the sides of the fire-place two closets

with three shelves in each thereof; lay across the side of the room upon which the fire-place is placed a 4 feet wide 2 inch rubbed York paving, set in mortar upon dwarf brick walls; to lay the other portion of floor with $1\frac{1}{4}$ inch yellow deal, listed, free from sap-wood, on fir joists, English oak sleepers and brick piers, with the ground excavated full 6 inches below the sleepers; to put square skirting 6 inches wide of cement, to fit up the window with $1\frac{1}{2}$ inch ovolo sashes glazed with second Newcastle glass complete, and double-hung with large patent lines, iron weights, and iron pulleys, in deal-cased frames with English oak sunk sills; to put $1\frac{1}{4}$ in. bead-butt and square-framed shutters, to fold back against the wall, hung with strong hinges, bar, and bolts complete; to put $1\frac{1}{4}$ inch yellow deal four-panel moulded and square-framed door, with lock and hinges, and $1\frac{1}{4}$ inch linings with mouldings round the same; to put a 2 inch Portland stone chimney-piece, and a 2 inch Portland stone slab, wood mantle-shelf and dressings, and $2\frac{1}{2}$ inch Yorkshire stone hearths; to lay on the water with $\frac{3}{4}$ inch strong lead pipe; to provide and fix a cistern to contain 100 gallons, with a case of $1\frac{1}{2}$ inch yellow deal, and line the bottom thereof with 7lb. cast-lead, and the sides thereof with 5lb. milled-lead (or as the case may be, a cistern of strong slate secured together by sufficient copper bolts), to put over the cistern a cover of $\frac{3}{4}$ inch yellow deal; and to put a Yorkshire stone-sink with strong 2 inch waste pipe and brass bell-trapped grate thereto complete; to provide and fix a good dresser with 2 inch clean deal top, inch yellow deal pot-board, and with drawers, shelves, and cut-standards complete; to lath where requisite, plaster, set, and whiten the ceiling, and plaster, set, and colour the sides of the kitchen, and of the closets attached thereto.

CELLARS.

To repair and make good all the vaulting with the requisite new sound stock-bricks, and to point the brickwork where requisite; to inclose the cellars with new brick-work and inch yellow deal cross-tongued and ledged doors, in fir proper door-cases, 4 inches by 5 inches, with strong hinges and stock-locks; to pave all the cellars with hard stock-bricks laid flat in mortar, and grouted between the joints with liquid mortar; and to fit up the coal-cellar door with $1\frac{1}{4}$ inch yellow deal sliding coal-boards 4 feet high.

WATER-CLOSET.

To fit up the water-closet with apparatus cistern-pipes, Honduras mahogany seat riser and flap, door, skirting floor, plastering, and paper-hanging complete.

(See pp. 105 and 106).

STAIR-CASE AND PASSAGE.

To put inch clean yellow deal steps, risers, and landings, with return moulded nosings, $1\frac{1}{4}$ inch yellow deal, sunk, moulded, cut and mitred string-boards, strong square bar-balusters, each tenth baluster being of wrought-iron, turned and framed newels, moulded hand-rail of Spanish mahogany up two stories, and of deal to all the remainder of the stair-case, curtail-step and scroll at the ground-story, windows the same as to the two-pair story, $\frac{3}{4}$ inch yellow deal torus-skirting with grounds complete, plaster-moulded block-cornice, arch and two enriched plaster-trusses in the passage; to lath where requisite, plaster, float, set and whiten the ceilings and strings; and to plaster, float, set and hang with figured paper, value 6*d.* per yard, cut close, all the sides of the stair-case and passage from the basement-story upwards (or stucco and paint four times, as the case may be).

OUTSIDE.

To make perfect all the brick-work; to cut out and make good in a secure, neat, and workmanlike manner, with new sound bricks and new quick cement to all the settlements over the front entrance and ; to inclose the fore-court as to the adjoining house with iron rails, gate, and Portland stone curb; and to provide and lay two courses of $2\frac{1}{2}$ inch Yorkshire paving outside the railing: to put a Portland stone solid step to the principal front door-way, and $2\frac{1}{2}$ inch Yorkshire stone paving 4 feet wide from the outer gate up to the principal front door-way; to put solid Portland stone steps from the back parlour window to the garden.

To raise the south garden wall 2 feet higher with new grey stock brick-work set in stone-lime mortar; to inclose the east end of the intended garden with a wall to correspond with the south garden-wall when

raised; to rake out, point with stone-lime mortar, and make complete all the present walling round the intended garden; and to finish all the garden walls with brick-on-edge, and double plain tile cresting, both set in and jointed with good quick cement and Thames sand, mixed together in equal measures.

Water service. (See pp. 105 and 106).

GENERALLY.

To make perfect the whole of the carcass, providing for that purpose all requisite new Baltic yellow fir timber, all requisite new brick-work, and all other requisite materials; to complete the cellar with all fittings requisite thereto; and to finish the whole of the house and premises with all labour, materials, ironmongery, and joiner's work, and other works whatsoever which may be necessary for rendering the whole of the house and premises complete, though not particularized in this specification; to paint four times with the best oil-colour, as may be directed, the whole of the internal and external works usually painted, and to flat extra in three tints to match the paper all the joiner's work of the ground-story and one-pair-story; to make all requisite cess-pools, drains, and watercourses; and to leave the whole of the house and premises fit for occupation, with all the locks, keys, hinges, brass-work, appurtenances, fittings. and fixtures, in every respect complete, and to the satisfaction of such architect as may be appointed by the (lessee) to superintend the same.

CHAPTER VI.

SPECIFICATION *for the erection of* AN ADDITIONAL STORY, *for other additions, and for alterations and repairs to the house and premises No. for , from the designs, and under the superintendence of , of , architect.*

BRICKLAYER.

Notice, &c., to district-surveyor, &c.

To give to the district-surveyor, and to all the other public officers concerned in the execution of the intended works, the requisite notices, to obtain all requisite licences, and to pay to the district-surveyor and to the other public officers their proper fees and charges.

Taking down, &c.

To take down the parapets and as much of the other brick-work of the house and premises as may be unsound, or which will of necessity require removal, in order to carry into effect the intended alterations and additions to the house and premises.

Digging, cartage, &c.

To remove from the basement-story all the sub-divisions thereof, and to remove from all round the four walls the ground and brick-work and other materials and things at present lessening the dimensions of the cellarage. (This cellarage had extended only partially under the site of the house.)

To excavate the basement-story, with the new vaults and areas intended to be thereto attached, so that the story may be 8 feet deep below the upper surface of the ground flooring; and to dig out for the foundations of the intended new brick-work, and as may be otherwise found necessary.

The ground is to be removed to full 18 inches below the paving and boarded floor of the ground-story of the back buildings.

To beat down and consolidate the ground under all the footings; to fill in again and consolidate the ground to the brick-work, and as may be otherwise found necessary to the house, buildings, and premises.

Concrete. (For new walls, see p. 78).

To remove and cart away all the superfluous earth, ground, useless materials, and rubbish, and leave the whole of the house, buildings, and premises, finally clear from rubbish.

Indents, &c. To cut and parget in the old brick-work perpendicular indents where requisite in order to receive the intended new brick-work; and to make good in a sound and workman-like manner all damage which may be caused to the brick-work by cutting the said indents.

Under-pinning, &c. To under-pin and repair thoroughly, in the most careful manner, with new hard stock brick-work, as may be found necessary, the walls around the basement-story.

Making good, &c., &c., with cement. To cut out carefully the brick-work for the reception of the breast-summer, story-posts, and granite sill of the intended shop-front, and to make good thereto in the most skilful and workman-like manner with the requisite new brick-work.

To cut out an opening in the back-wall of the basement-story, to arch over the same, to form an external area round the said opening with walls of 9 inch brick-work, and to put over the new area a grating of cast-iron, with frame-work one inch square, with strong flanges, and with bars $\frac{5}{8}$ inch by 1 inch and not more than $1\frac{1}{2}$ inch apart.

To cut out and make good the brick-work in like manner between the intended shop and counting-house, and between the front area and the basement; and to turn thereto arches of the thickness of the wall and 9 inches wide in front; and to turn under the same openings counter-arches of the same description, but only of a segmental form rising 1 foot.

To cut out the brick-work for the insertion of the girders, binders, plates, and as elsewhere may be found necessary, and to make good the brick-work thereto.

The whole of the brick-work to the above-described

alterations and repairs is to be set in cement and clean Thames sand mixed together in equal measures.

General brick-work.

To execute all brick-work requisite for forming and for completing the intended additions, alterations, and works to the house buildings and premises, with the appurtenances thereof. (See p. 78).

Vaults.

To construct the intended two new vaults in brick-work 9 inches thick, with the spandrils over the same filled up to an altitude within 9 inches of the inside of the vaulting with concrete.

To stucco over $\frac{3}{4}$ inch thick with pure quick cement, the whole of the outside of the vaulting and the whole of the walls supporting the same.

Chimneys, &c.

To carry up the intended new chimneys according to the drawings, and to properly turn, parget, and core the same; to finish the chimney-shafts with salient-courses 6 inches high and double plain-tile cresting, flanched round with plain-tiles. The whole of the chimney-pots, tile-crestings, and tile-flanchings, are to be set in and to be jointed with new quick cement and clean Thames sand mixed together in equal measures.

To put to the new fire-places on the ground-story fenders of 9 inch brick-work 18 inches high to support the slabs, and to put to all the other new fire-places half brick trimmers.

To take down and cut away very carefully the whole of the present chimneys of the front parlour and back parlour on the ground-story, as may be found requisite to the old brick-work, so as to make the same complete together. The whole of the brick-work to this work is to be set in cement and Thames sand mixed together in equal measures.

Copper.

To repair and re-set the present copper with wrought-iron furnace-bars, door, frame, fire-bricks, and all other requisite new proper work and appurtenances complete.

Tile-cresting, &c.

To finish all the walls (which have not other copings) with brick-on-edge and double plain-tile cresting, both set in and jointed with new quick

cement and clear Thames sand mixed together in equal measures.

Drainage. (See p. 77).

Gauged arches. To put to the front windows of the intended new attic-story gauged arches to match the present gauged arches in the same wall, accurately cut and set quite closely, particularly at their soffits and backs.

Rough arches. To turn to all the other openings the requisite arches, and tuck-point on their fronts and soffits all the external arches.

Bedding, &c To bed in mortar, the plates, lintels, templets, and wood-bricks, and to bed and point with lime and hair mortar the door-cases, window-frames, and all the other things in or about the house, buildings, and premises, which will so require.

Piers under the floors To build under the sleepers of the new ground-flooring brick piers not more than 3 feet apart and each 9 inches by 4 inches and 9 inches high, with a foundation 6 inches high 9 inches by 9 inches.

Cross walls. To put under the paving of the intended new kitchen, and of the closets, lobby, and staircase thereto attached, one brick cross wall 18 inches high.

Facings. To finish the external face of the new brick-work of the principal front of the house with hard bricks, to match, as nearly as possible, the other bricks of the present front.

Pointing To rake out, clean, and flat point, in the very best manner, the whole of the external brick-work of the eastern front of the house, the new brick-work thereof being stained to match the old brick-work thereof.

Other pointing. To rake out and point with stone-lime blue mortar all the remainder of the old brick-work of the house, buildings, and premises.

½ rod extra brick-work. To provide and execute under the contract half a rod reduced of brick-work extra, to be used in such additional works as the architect shall direct; the value of such thereof as may not be so ordered to be used, is, however, to be deducted from the amount of

the consideration of the contract after the rate of per rod reduced, and if any further additional brick-work be ordered by the said architect, the same is to be performed by the contractor at the like price of per rod reduced.

Bricks. To clean such of the present bricks as will of necessity be taken down or be removed from the present buildings, and which will still remain sound and not broken into less than half-bricks; and to provide new hard well-burnt grey stock-bricks sufficient for completing the intended new brick-work with the sound old bricks above described and the intended new facing-bricks.

Mortar. The whole of the mortar is to be compounded in the proportion of one third by measure of the very best stone-lime, and twice that measure of clean sharp Thames sand.

Grouting, &c. The whole of the brick-work is to be entirely flushed in at every course with mortar, and all the work more than 9 inches thick is to be grouted at every alternate course thereof with liquid mortar, great pains being taken that the outer faces of the work shall not be stained.

Mode of doing the work. No four courses of the work are to rise more than one inch besides the height of the bricks; the external principal front is to be built in manner of Flemish bond through the whole thickness of the work, without any of the ties being broken. (See p. 78).

Jobbing-work. To perform to the house, buildings, and premises, and to the appurtenances thereof, all such bricklayer's work as may be necessary thereto in the nature of jobbing.

MASON. (See p. 79).

Granite sill. To provide and bed all along under the story-posts of the shop-front a continuous sill 19 feet 6 inches long of the best Aberdeen granite, parallel square curb 12 inches by 8 inches, in not more than five pieces, with all the joints thereof worked fairly and plugged with lead; and to cut out in the top of the granite curb mortise-holes to receive the bases of the story-posts and columns.

Stone for external cornice.

To provide and bed in the new brick-work of the principal front a course of Yorkshire stone 20 inches wide, for forming thereon the intended external cornice and pediment above the new attic-story.

NOTE.—If any of the present front coping will serve instead of the Yorkshire stone above described, the same may be used in the cornice.

Window-sills.

To put to the front windows of the intended new attic-story sills of Portland stone 9 inches by 5 inches, properly sunk, weathered, and throated; and to put to all the other new windows, sills of 3 inches Yorkshire paving 9 inches wide, wrought with fair edges and ends, and throated and laid sloping. (See p. 80).

Paving of fore-court.

To cover over the front area at the sides of the intended grated folding trap-doors, with $3\frac{1}{2}$ inch Yorkshire stone wrought with fair edge.

Public pavement.

To make good the public pavement, or to pay to the proper authorities such sum for so doing as they may require.

To provide and let into the stone paving a strong cast-iron coal-plate with proper fastenings thereto.

Pavement of yard and kitchen.

To take up all the present paving of the yard, and to pave the yard, and also the dust-bin, the kitchen, and the stair-case, the lobby, and the closet thereto attached, with new $2\frac{1}{2}$ inch Yorkshire stone, and the present Yorkshire stone paving, all with the joints thereof wrought fairly through the whole thickness of the stone and laid in regular courses.

Sinks, &c.

To put in the paving of the yard and kitchen two five-hole sink-stones, each wrought out of a piece of 4 inch Yorkshire stone 16 inches square; and to refix and make complete in the kitchen the present sink.

To provide and let into the paving two very large square-trapped iron gratings.

Chimney-pieces.

To remove, alter as may be found requisite, repair, clean, refix in the back-room on the one-pair-story, and make complete, the chimney-piece at present in the front-room on the ground-story; and to alter as may be found requisite, repair, refix, and make complete to

the new fire-places, such of the present chimney-pieces (to be taken down in order to make the intended alterations) as will be suitable thereto; to provide and fix to the other new fire-places new jambs, mantles and shelves, all of the best $1\frac{1}{4}$ inch Portland stone 6 inches wide; and to repair and make complete as far as may be found necessary the other chimney-pieces of the house.

Slabs. To put to the intended new fire-places such of the present slabs as will of necessity be removed from the present buildings and which will remain sound; and to provide and bed to the fire-places new slabs of 2 inch Portland stone 18 inches wide, sufficient to make up all deficiency.

Hearths. To put to all the intended new fire-places back-hearths of $2\frac{1}{2}$ inch rubbed Yorkshire stone.

SLATER.

To take off carefully the whole of the present slating of the buildings of the premises; to square such of the present slates as remain sound, and to slate all the new roofing of the buildings, including the curb rafters of the back-buildings, using the sound present slates, and providing the best new strong slates sufficient to complete the roofing.

The whole of the slating is to be fixed with strong copper nails, and is to have proper bond in every part, particularly at the eaves and at the heading courses thereof, with proper cut closing-courses, instead of having slates laid lengthwise with narrow slips of slate between them.

To point the inside of all the slating with good mortar, composed of stone-lime and Thames sand, and with sufficient hair therein.

To cover the two spaces between the chimneys at the side of the North upper gutter with two layers of very strong slates bedded in cement.

To repair and make good all damage which may, during the progress of the works, occur to the slating; and to leave the slating perfect and to the satisfaction

of the architect at the final rendering up of the whole of the works as complete.

CARPENTER AND JOINER.

Materials, &c.

To provide sufficient new materials for, and frame and fix all carpenter's work and joiner's work of every kind (complete with all proper nails, spikes, screws, and other proper ironmongery of the best quality) which may be requisite for carrying into effect and for finishing in every respect the works of the intended additions, alterations, and repairs to the house and premises.

Timber and deals.

All the oak-timber is to be of the best English growth; all the other timber is to be the best yellow fir, either from Dantzic, Riga, or Memel; all the floors, joiner's work, and other wood-work, are to be of the best yellow Christiana deal, except where herein otherwise directed. All the timber and deal are to be cut die square, and perfectly free from sap-wood in any part thereof, and from shakes, large knots, and all other defects; none of the joists, ceiling-joists, rafters, or quarters, are to be respectively more than 12 inches apart.

Present materials.

The sound portions of the present timber-work and other wood-work may be used in the performance of the intended additions, alterations, and repairs to the house, buildings, and premises, as far as the same may agree in scantling, thickness, dimensions, nature, and fashion, with the materials described in this specification.

Sundries.

To provide and fix 4 cwt. of iron in such stirrups, screw-bolts, ties, and other light-wrought and hammered work, as the architect may direct. All additions to the quantity of iron-work, and all deductions therefrom, are to be taken at the rate of per pound, including the fixing thereof.

To provide and fix all requisite, temporary, and permanent shores and struts, all requisite fillets, tilting-fillets, beads, stops, rebated angle-staves, blocks, bearers, furrings, templets, and other proper and usual fittings, and to provide all requisite workmanship, and to perform all the rebating, tonguing, grooving, beading, scribing, housing, framing, planing, and other labour

usual and proper in or about carpenter's work and joiner's work.

(Also see p. 82).

Shoring. To provide, fix, alter, as occasion may require, and finally remove all such needles and shoring as may be requisite, in order to support properly and effectually the house, buildings, and premises, and every thing therewith connected, during the cutting out for, and the insertion of, and the making good to the intended new breast-summer columns and story-posts, and during the performance of the other intended works and alterations to the house, buildings, and premises, so as to prevent accident or injury thereto or to any adjoining property.

Centering. To provide, fix, ease when so directed by the architect, and finally remove, centering and turning pieces sufficient for constructing the intended new vaults and all the intended new arches and brick-trimmers.

Ground flooring. To take up and remove the whole of the present flooring of the ground-story of the house and premises, and to put over the basement-story an entirely new flooring of $1\frac{1}{2}$ inch yellow deal, listed free from sap-wood, wrought on the upper side, ploughed and tongued with wrought-iron three-sixteen inch by $1\frac{1}{2}$ inch, and laid upon fir joists 6 inches by 2 inches in one length from east to west, and bridged upon four binders of fir 12 inches by 8 inches, and two end binders of fir 12 inches by 4 inches.

The ground-floor is to have a large trap-door therein hung with very strong wrought-iron joints, and a strong flush ring; the well-hole of the trap-door is to have inch deal linings round it; and the contractor is to provide and fix a framed and wrought step-ladder of $1\frac{1}{2}$ inch deal, with a strong guard-rail, with proper standards to lead from the ground-story to the basement-story.

To lay to the intended new counting-house, parlour, and water-closets, and to the staircase and to the closets thereto attached, boarded flooring with joists upon sleepers not more than 4 feet apart, all composed of the sound parts of the present timbers and boarded-flooring of the ground story, but made complete and

perfect with as much new materials as may be found requisite.

One-pair flooring. To take up the present boarded floor of the room over the present kitchen; to fill in and complete the joists and other timbers of the present one-pair-story; to construct flooring to the remainder of the one-pair story, as intended to be enlarged, with plate 4 inches by 3 inches; joists 6 inches by 2 inches; and trimmers and trimming-joists 6 inches by $2\frac{1}{2}$ inches; and to lay the whole of the story with such of the present flooring-boards as remain sound and good, and such quantity of new inch yellow deal listed free from sap-wood as may be requisite for making up all deficiency.

Attic-floor. To construct to the intended new attic-story of the house a floor with wall-plate 4 inches by 4 inches, joists 9 inches by $2\frac{1}{2}$ inches, and trimmers and trimming-joists 9 inches by $2\frac{3}{4}$ inches, and to lay the whole of the story with inch yellow deal wrought and listed free from sap-wood.

Roofing over the lower buildings. To form roofing to the lower buildings, with wall-plates 4 inches by 3 inches, two ties 9 inches by $3\frac{1}{2}$ inches, angle-ties. each 3 feet long, and scantling 4 inches by 3 inches, rafters 4 inches by 2 inches, ridge and hips 1 inch by 8 inches, slate battens $\frac{3}{4}$ inch by $2\frac{1}{4}$ inches, and ceiling-joists 3 inches by 2 inches, spiked in one length beneath the ties: to construct the intended flat over the counting-house, water-closet, and a portion of the yard, with a girder 12 inches by 6 inches running North and South from wall to wall, with joists 4 inches by $2\frac{1}{4}$ inches framed thereinto, with a well-hole for a circular sky-light, and covered on the outside with inch yellow deal boarding for lead, with a gutter and rolls.

The curb roofing on two sides of the flat is to be formed as quartered-partitions, with heads 4 inches by 4 inches, posts 4 inches by 3 inches, plate or tie all along above the doorway 4 inches by 4 inches, braces or struts 4 inches by 3 inches, quarters or rafters 4 inches by 2 inches, and slate-battens $\frac{3}{4}$ inch by $2\frac{1}{2}$ inches.

Upper roofing. To construct the roofing over the intended new attic-story with wall-plates 5 inches by 4 inches, angle-ties each 4 feet long 5 inches by 3 inches, tie-

beams 10 inches by $3\frac{1}{2}$ inches, rafters 5 inches by 2 inches, ridge $1\frac{1}{4}$ inch by $8\frac{1}{4}$ inches, slate-battens $\frac{5}{4}$ inch by $2\frac{1}{4}$ inch, and ceiling-joists 3 inches by 2 inches spiked in one length beneath the binders.

To form in the roof a dormer with fir frame-work and proper door-case 4 inches by 4 inches, quarters and joists 4 inches by 2 inches, inch yellow deal external boarding all over, $\frac{3}{4}$ inch yellow deal wrought, ploughed, cross-tongued, beaded and ledged inner trap-door, and outer trap-door hung with $\frac{3}{4}$ inch deal beaded linings and with strong hinges, bolts, and all other requisite fittings and appurtenances.

Cisterns.

(See pp. 105 and 106).

Gutters.

To construct to the roofs, gutters as shown by the plans, with inch yellow deal bottoms on strong fir bearers, and laid to current $1\frac{1}{2}$ inch to every 10 feet, and with $2\frac{1}{2}$ inch rebated drips; and to put at the sides of the gutters $\frac{3}{4}$ inch deal lear-boards 9 inches wide.

Quartered-partitions.

To construct the intended new quartered-partitions with heads and sills 4 inches by 4 inches, tie-plates above the doorways 4 inches by 5 inches, posts 4 inches by $3\frac{1}{2}$ inches, braces or struts 3 inches by 3 inches, quarters 4 inches by 2 inches, and three tiers of inter-ties 1 inch by $2\frac{1}{2}$ inches.

To take down the quartered-partitions of the ground-story and to inclose the staircase as shown by the plan.

To put beneath the joists of the one-pair-story, and immediately under the quartered-partitions between the front and back rooms of the house, a new fir girder 14 inches by 8 inches fairly wrought all over, and with a templet of oak at each end 2 feet 6 inches long and scantling 6 inches by 4 inches.

Framed deal partitions.

To put in the situations shown by the plans 2 inch deal framed partitions with three heights of panels of $\frac{3}{4}$ inch deal, no panel thereof being more than $10\frac{1}{2}$ inches wide; the partition between the counting-house and the shop is to be sashed.

Note.—The present deal partitions may be

used again in the kitchen as far as applicable and sound; but the said partitions are to be altered, repaired, and made good, as may be found necessary.

Skirtings. To skirt with inch deal 8 inches high, plugged to the walls, the whole of the intended new attic-story and the whole of the back buildings of the house, and their closets, and all other appurtenances.

Angle-staves. To put to all the projecting angles of the new plastered work proper rebated and quirked angle-staves. (If cement angles are not intended.)

Shop-front, &c. To construct and fit up a new shop-front to the house, with fir breast-summer 14 inches by 12 inches and 18 feet 6 inches long, three fir story-posts 12 inches by $3\frac{1}{2}$ inches, each with a cast-iron socket-shoe weight 28lbs. The shop-front to be according to the drawings, with mahogany moulded muntins and sills, and head and carved spandrils to the arched heads; the doors to be 2 inch mahogany moulded and glazed upper panels, and two moulded lower panes. Provide and fix 1 inch deal fascia, cornice to deal, $1\frac{1}{2}$ inch stall-board, panelled boxings for
patent revolving iron shutters, all hung complete with proper apparatus.

To provide and fix under the intended new breast-summer two cast-iron columns each 4 inches diameter at bottom and $3\frac{3}{4}$ inches diameter at top, and with plate-caps and bases also of cast-iron, 10 inches square and $1\frac{1}{2}$ inch thick.

To put behind the fanlight four wrought-iron horizontal guard-bars one inch square, securely fixed to the wood frame-work.

To provide and fix in the stone paving before the shop-front a pair of wrought-iron flat trap-gratings, with frames $\frac{3}{4}$ inch, by $\frac{5}{8}$ inch bars $\frac{3}{8}$ inch by $\frac{3}{4}$ inch, not more than $1\frac{1}{2}$ inch apart, rebated iron outer frame, socket-hinges, and with fastenings value 10*s.*

To provide and fix to the front external doors, knockers, p. c., 10*s.* each; and to provide, let into the stone landing by the same door, and run thereinto with lead, a shoe-scraper, p. c., 7*s.*6*d.*

Doors. To take down and repair the present front external entrance-door, and to adapt and re-hang the same where shown on the plans, with the hinges, lock, and all the other appurtenances thereof made complete.

To repair thoroughly, alter as occasion may require, and hang with hinges, locks, and all the other appurtenances thereof made complete, the other doors of the premises severally in situations where the same will be appropriate, and to provide new 2 inch deal four-panel square-framed doors with $\frac{3}{4}$ inch deal panels, sufficient to complete the whole of the house, buildings, and premises; to hang the whole of the said doors with 4 inch butt-hinges, and to put to each door a strong best 7 inch iron rimmed lock with good plain brass furniture.

The two doors of the counting-house are to have ovolo sashes in the upper parts of them.

Door-linings, &c. To put to all the door-ways the requisite linings of $1\frac{1}{4}$ inch deal single-rebated, framed, grooved, and with large quirked beads next the plastering.

Windows. To fit up the intended new parlour and new kitchen with the windows (with the fittings, shutters, and other appurtenances thereof) to be taken from the present two parlours on the ground-story of the house, the same being repaired thoroughly, altered as may be found necessary, and made complete.

To fit up the intended new closet-room on the one-pair-story with the window at present by the first landing of the staircase, repaired and made complete, and with a new oak weathered and throated sill to project 3 inches before the slating, and with $1\frac{1}{4}$ inch quirked bead all round on the outside scribed over the slating, and a quirked bead all round on the inside next the plastering.

To put to the intended enlarged window-opening on the first landing of the front staircase a pair of 2 inch deal ovolo French casements, hung with 4 inch butt hinges and fastenings, value 5*s*., in a solid fir frame 4 inches by 4 inches, with a rebated oak sill 4 inches by $3\frac{1}{2}$ inches.

To fit up all the other new windows with $1\frac{1}{2}$ inch ovolo sashes, double hung with large patent lines, brass axle-pulleys, iron weights, and patent spring fastenings, in deal-cased frames with oak sunk sills; and to put round all the said windows next the stucco inch quirked and rebated beads.

To put in the leaded flat over the intended new counting-house a metal conical skylight, with a large air-cap with brass-cased balance-weights and brass pulleys and patent lines, and deal circular curb and cradling, and all other proper fittings and appurtenances complete.

To shorten the present one-pair-front windows by taking away the upper row of squares of glass in the sashes, and by raising the sills sufficiently to reduce the frames in height thereto; to repair and make complete the same windows; to alter, adapt, re-fix, and make good all the appurtenances of the same windows, and to re-hang the sashes thereof with new large patent lines.

To clean from rust, repair, re-fix, and make complete before the one-pair-front windows the present balconies.

Closets. To construct the several closets as shown by the drawings with deal framed partitions as herein before described, to put to each closet $1\frac{1}{4}$ inch deal square-framed door corresponding with the other adjoining doors, and hung with 3 inch butt-hinges and strong 5 inch closet-locks, each with two keys, and each closet is to have the requisite stops and linings, and is to be fitted up on the inside thereof with four tiers of inch deal shelves as wide as the closet will admit, and securely fixed on proper bearers.

Dwarf closets. To take down from the ground-story the present four dwarf closets, to alter, re-frame, as may be found necessary, render uniform, and re-fix the same in the intended new parlour and new counting-house, with the fronts, shelves, and other fittings thereof.

Staircases. To alter the head of the upper staircase as may be found requisite, and to construct an additional flight of stairs from thence to the intended new attic-story, with landings, treads, and risers of inch yellow

clean deal, on strong bracketed carriages, and with string-boards, hand-rail, newels, balusters, and all other fittings and appurtenances to correspond with those to the lower part of the staircase.

To take down, remove to the situation shown by the plans, repair thoroughly, alter as may be found requisite, and fit up and make complete and perfect the present staircase of the back-building of the premises.

Water-closets.

To fit up the two water-closets with the present fittings repaired, re-worked, altered as may be requisite, and made complete.

To put to the eastern water-closet, moveable casings of inch deal sufficient to conceal the pipes, and with beaded grounds, buttons, and all proper appurtenances complete.

To form in the quartered-partition between the front water-closet and the cistern, a doorway, and to put thereto a door with linings and hinges, as described to the other closets, and to put to the same door a brass button.

Dust-bin.

To put to the dust-bin a curb of oak 4 inches by 4 inches, and a ledged door of $1\frac{1}{4}$ inch oak with oaken slides.

Dresser.

To repair, alter as may be found requisite, re-fix in the intended new kitchen, in the situation shown by the plan, and make complete, the present kitchen dresser.

General repairs to the wood-work, &c.

To examine in the most careful manner all the old timber-work, joiner's work, and wood-work generally, of the whole of the house, buildings, and premises, and to repair the same where necessary in the most complete and workman-like manner, providing for that purpose all requisite new materials of the very best quality; to ease and re-hang such of the doors and windows as will so require, providing the requisite new hinges and large patent lines; and to prepare the whole of the wood-work properly for painting.

Ironmongery and brass-work.

To take off all the locks and brass-work of the house, buildings, and premises; to clean, repair

thoroughly, and re-fix such thereof as may turn out worth reparation, the good brass-work being first lacquered; and to provide and fix all brass-work, locks, and other ironmongery of the best plain quality, which may be requisite in order to complete the house, buildings, and premises.

20 cubic feet extra fir timber.

To provide and fix under the contract 20 cubic feet of the best fir timber in joists, rafters, or quarters, to be used in such additional works as the architect shall direct; the value of such thereof as shall not be so ordered to be used is however to be deducted from the amount of the consideration of the contract at the rate of per cubic foot; and if any further additional timber-work be ordered by the said architect, the same is to be performed by the contractor at the like price of per cubic foot.

Jobbing-work.

To perform to the house, buildings, and premises, and to the appurtenances thereof, all such carpenter's work and joiner's work as may be necessary thereto in the nature of jobbing.

PLASTERER.

Troweled stucco.

To execute with the very best floated and troweled stucco, lathed were requisite, the whole of the sides of the intended additional story to the house, and the sides of the intended counting-house, parlour, and kitchen, of the new chambers over the same, and of the staircases and closets attached to the same

New ceilings and strings.

To put to all the intended new rooms, closets, staircases, and other new parts of the house, and to the two-pair-story of the house, and also to the whole of the shop; new lathed, plastered, floated, set, and whited ceilings and strings.

Repairs to the present plastering.

To wash, scrape from paper-hanging, and whitewash, repair, and make good and complete as far as may be found necessary, all the remainder of the old plasterer's work of the front principal house; to remove from the present kitchen and from the other rooms and buildings in the rear of the front house, all the present plastering, and to prepare properly the work for the intended new stucco.

Whiting.

To whiten all the ceilings, strings, reveals, and cornices of the house and premises.

To lime-whiten twice the whole of the sides of the basement-story, including the vaults and areas thereof; and to lime-whiten twice in like manner, the whole of the timbers of the ground-floor above the basement-story, and the underside of the flooring-boards of the same flooring.

To form all requisite reveals, beads, quirks, and arrises.

SMITH AND PLUMBER.

Present lead-work.

To take off from the roofs of the house and premises all the lead-work at present upon the same.

New 7lb. gutters and flat.

To lay all the new gutters and the intended new flat with milled-lead, weight 7lbs. to the foot superficial, turned up full 5 inches next the brick-work and full 9 inches over the rafters.

4lb. milled-lead to hips and ridges.

To cover all the hips and ridges of the roofs with 4lb. milled-lead 16 inches wide, secured with strong copper nails and properly dressed down over the slates.

4lb. milled-lead flashings, step-flashings, &c.

To put in the brick-work round the gutters and round the leaded flat flashings of 4lb. milled-lead 5 inches wide.

To put in the brick-work round the headings and ends of the slating flashings of 4lb. milled-lead, average width 12 inches, and set step-wise to the raking parts of the slating.

5lb. milled-lead to dormer.

To cover the top and the sides of the dormer with 5lb. milled-lead, turned down all round full 8 inches, and to put over the sill of the dormer-door a flashing of 5lb. milled-lead 30 inches wide.

6lb. milled-lead to shop-front, 4lb. flashings.

To cover the cornice of the shop-front with 6lb. milled-lead turned up 5 inches next the front of the house, and with a flashing of 4lb. milled-lead 6 inches wide, let into the brick-work.

Water-closets

To take up and remove the present water-closet apparatus, and the pipes and other appurtenances thereof.

To put to the water-closet adjoining to the kitchen a white basin with a proper strong hopper trap, and a short soil pipe leading into the drain.

To fit up and make complete the intended new water-closet adjoining to the counting-house with the present water-closet apparatus and appurtenances, previously examined, cleaned, repaired, and made perfect, and such parts thereof as are deficient being wholly renewed in the best and most improved manner of which the circumstances will admit.

Laying on water, pipes, &c.

To lay on the water from the pipes under the public-way, to the intended two cisterns, and from them to the two water-closets and to the sink, with very strong cast-iron 6 inch pipe, cocks, bosses, balls, and all proper appurtenances; the cock to the western water-closet is to have a drop brass handle.

To put from each cistern to the drain a very strong cast-iron $1\frac{1}{4}$ inch waste-pipe; and to put from the sink to the drain a very strong lead $2\frac{1}{2}$ inch waste-pipe, with a large brass bell grate at the top thereof.

Eaves' gutters and R. W. P's.

To put round the eaves of the low back buildings 4 inch cast-iron eaves' guttering, fixed on strong wrought-iron brackets; and to put from the several gutters cast-iron rain-water-pipes $3\frac{1}{2}$ inches diameter, fixed with heads and shoes complete.

All the nails used in the plumber's work are to be lead-headed.

Grates.

To provide and set to all the new rooms, grates, average price, each £1 10*s*.

PAINTER.

Preparation.

To knot, stop, pumice, smoothe in every part, and prepare properly, all the wood-work of the house and premises now painted or intended to be painted; and to prepare in like manner as far as necessary the stucco and other works of the house and premises.

4 times in oil-colour. To paint four times with the best oil-colour, all the new stucco work, all the plastered sides of the present front house, and all the new wood-work, iron-work, and other works of the house and premises which are usually painted; and to bring forward and paint in like manner all the old works at such parts thereof as will be altered or re-worked; the first two coats of colour on the iron-work are to be red lead paint.

Twice in oil-colour. To paint twice with the best oil-colour all the old wood-works and other works of the house and premises which usually are painted.

Flatting. To flat extra in three tints of plain colour all the painting of the front-room on the one-pair-story.

Colours. The sashes are to be finished dark purple brown; the other painting is to be finished of such teints of stone-colour, or of such other plain colours as the architect may direct.

Graining. To comb finely, grain in imitation of wainscot in the very best manner, and varnish twice with the best copal, the whole of the external wood-work of the shop-front and of the doors therein, the mahogany sashes only excepted, as they are to be French polished.

GLAZIER.

Plate glass. To glaze with the best strong British plate-glass the window, the door, and the fan-light of the shop-front.

Ground glass. To glaze the conical skylights over the intended new counting-house with the best ground glass.

2nd Newcastle glass. To glaze all the other windows, sashes, and lights of the house and premises, with good second Newcastle crown glass, and to cut out from the old windows sashes and lights, all the cracked and broken glass of every kind, and to make good the same with sufficient new second Newcastle glass.

All the new glazing is to be properly bedded, bradded, and back-puttied; all the old glazing of the house is to be re-puttied; and all the glazing of every kind is to be cleaned and left perfect at the final rendering up of the works as complete.

CHAPTER VII.

SPECIFICATION *of Works to be done at the house and premises No. , for , in the erection of a* NEW PARLOUR AND A NEW KITCHEN *at the rear of the said house, and in alterations to the shop and other parts of the said premises, for of from the plans and superintendence of of architect.*

BRICKLAYER.

District-surveyor, &c. To give to the District Surveyor and to the other public authorities the requisite official notices, and to pay to them their proper official fees.

Pulling down. To take down and remove as much of the fence-walls of the yard, and as much of the other brick-work of the house and premises, as will be requisite in order to make to the buildings and premises the intended additions and alterations.

Excavating, &c. To excavate the ground of the whole of the present yard to the depth of 15 inches below the present level of the basement-story of the premises; to excavate the ground also for the footings and all the other works which will so require; and to fill in and ram hard the ground to all the footings and other works after the same are built.

Concrete. (See p. 75).

Cartage, &c. To clear and cart away from the house and premises all the superfluous earth, rubbish, and old materials: and to leave finally the house and premises clean and free from rubbish.

Brickwork for the new parlour, kitchen, &c. To cut and parget in the old brickwork proper perpendicular indents for the reception of the intended new brick-work.

To erect according to the drawings the requisite brick-work for the intended new parlour and kitchen,

with two courses of footings 1 foot 10½ inches thick, and two courses of footings 1 foot 6 inches thick, kitchen walls 1 foot 1½ inches thick, and walls round the parlour 9 inches thick.

To construct the fire-places, with the flues thereof properly turned, pargeted, and cored; the kitchen fire-place is to have a chimney-bar of wrought-iron 3½ inches by ½ inch; the parlour fire-place is to have a chimney-bar of wrought-iron 2½ inches by ⅜ inch and a 4 inch brick trimmer; each chimney-bar is to be properly corked on the outsides of the chimney-jambs; the new flues are to be arched over as conveniently as possible, and are to be turned into and to be properly united with the flues of the present west chimney-stack of the house; the two recesses at the sides of the parlour fire-place are from the dwarf-closets upwards to be formed in brick-work as semi-circular niches.

Copper.

To set in the scullery a copper to hold 20 gallons, with fire-bricks, wrought-iron furnace-bars and door, and all other proper work and appurtenances, and with a proper flue thereto.

To set in the new fire-places a kitchen range, p. c. £8, and a parlour-stove, p. c. £4.

To form a thickness of 6 inches of concrete under the stone paving of the new kitchen.

To repair and make good to the new brick-work the fence-walls and other adjoining old brick-work.

To cut out for as far as requisite, and bed and make good to the plates, wood-bricks, and lintels of the intended additions and alterations to the house and premises.

To arch over the several openings in the brick-work, and to tuck-point the external arches.

Water-closets, &c.

To build the brick-work requisite for the water-closets; to arch over in half brick-work the lower water-closet; and to erect from the new parlour to the water-closet a wall 6 feet high above the stone-landing, with the upper course of the work set in cement.

Drainage. (See p. 77).

Present back wall of the house. To take down and cut away as much of the present back wall of the house as may require removal, in order to admit of the staircase, folding-doors, and other alterations, as shown by the drawings; to repair, complete, fill in, and make good the said wall with sound hard stock-bricks set in new quick cement and clean Thames sand mixed together in equal measures.

Repairs, &c., to the ground story, &c. To repair and make good with brick-work to the walls of the ground-story wherever the same may be found defective, or may become so by the intended removal of the present works, and by the execution of the intended new works; and in like manner to make good in a workman-like mode to the intended new shop-front.

Present basement-story. To excavate the whole of the present basement-story of the house to the depth of 15 inches below the present average level thereof; to make good and under-pin carefully with sound stock-bricks set in new quick cement and clean Thames sand mixed together in equal measures, such portions of the sides of the basement-story as when the excavation is made will be found either defective or destitute of foundations, and to spread all over the basement-story a layer of concrete, 6 inches in thickness.

To take down and clear away all the present lathing and plastering of the basement-story.

To repair and stop the sides of the present basement-story, particularly at the parts from whence the present fittings will be removed, and round and between the timbers of the ground-flooring, after the lathing and plastering are removed therefrom.

Cellar entrance. To rebuild and make good the brick-work round the cellar-gratings, as far as may be found requisite in order to suit the new shop-front, and the cellar-entrance as intended to be altered.

Extra brickwork. To provide and execute under the contract, one fourth part of a rod reduced of stock brick-work to be used in such extra works as the architect shall direct; all additions to and all deductions from the quantity

of extra brick-work are to be made after the rate of per rod.

Jobbing-work. To perform in connection with the works herein directed to be done all such bricklayer's work as may be found requisite in the nature of jobbing.

Materials, &c. The whole of the new bricklayer's work (except where herein otherwise directed) is to be done with sound new hard well-burnt square grey stock-bricks of the very best quality, free from admixture of soft bricks, place-bricks, or other inferior bricks, and laid in and entirely flushed up at every course with well-beaten mortar, composed of one-third by measure of the best well-burnt stone-lime and two-thirds by measure of clear Thames sand; the whole of the external brick-work is to be faced externally with bright picked stocks of an uniform colour, with the joints thereof neatly struck and drawn.

MASON.

Window-sill. To put to the window of the intended new parlour a sill of 3 inch Yorkshire stone 9 inches wide, wrought with fair edge and ends, throated, and laid sloping.

Landing, &c. To put from the new parlour to the new water-closet, a landing of 3 inch tooled Yorkshire stone, properly pinned into the brick-work, and guarded at the north side thereof by a wrought-iron rail 2 inches by $\frac{1}{2}$ inch, and cast-iron bars $\frac{3}{4}$ inch square, 3 feet 6 inches high, not more than 4 inches apart, and let in the stone-work and run with lead.

To cover the upper water-closet with a piece of 3 inch tooled Yorkshire stone, wrought with fair edges, throated, laid sloping, and with the requisite pipe-holes cut therein.

Sink. To put in the scullery a sink of 7 inch Yorkshire stone securely fixed and cut out to receive the pipe and stench-trap. (See p. 81).

Chimney-pieces. To provide and set a fire-place in the parlour, p. c. £5, and $2\frac{1}{2}$ inch rubbed Yorkshire stone hearth and back hearth.

To put to the fire-place of the kitchen, jambs, mantle, and shelf, each of 2 inch Portland stone, 8 inches wide.

Paving &c.

To pave the whole of the present basement-story, the part coloured blue in the plan of the intended new kitchen, and also the yard, with the best new $2\frac{1}{2}$ inch Yorkshire stone, worked and rubbed quite fairly on the edges, and laid in and joined with cement in regular courses; to put in the yard a five-hole sink stone. (This paving was directed to be rubbed on the edges in order to prevent the access of vermin to the basement-story, which was intended for the warehousing of corn: for this purpose, a layer of asphalte upon concrete would have been quite as efficacious).

To pay to the Commissioners of Paving the expense of relaying and making good the public paving to the intended new shop-front and cellar-entrance.

SLATER.

To cover the roof over the intended new parlour with the best strong Duchess slating, lapped full $3\frac{1}{2}$ inches, and secured with proper bond in every part thereof with strong copper nails: and to leave perfect at the rendering up of the works the whole of the said slating.

CARPENTER AND JOINER.

Plates

To put in the walls of the intended new parlour and kitchen two wall-plates, each 4 inches by 4 inches, the wall-plates are to be continued all round the new brick-work, and are to be let into the old brick-work of the back-wall of the house.

Sundries.

(See p. 82.)

Floor.

To construct the floor of the intended new parlour with fir joists 6 inches by $2\frac{1}{4}$ inches, fir trimmers and trimming-joists 6 inches by $2\frac{3}{4}$ inches, and to lay the same with $1\frac{1}{4}$ inch yellow deal wrought folding floor clear of sap-wood.

Roof.

To construct the roof with rafters 5 inches by 2 inches, slate-battens 2 inches by 1 inch, and crown-

plate 4 inches by 3 inches, let into the old brick-work: the rafters are to be framed opposite the window of the one-pair back-room, so as not to rise above the same, and the roof is to be made complete with all requisite other fittings. To prepare for the parlour-ceiling by putting horizontal ceiling-joists of fir $3\frac{1}{2}$ inches by 2 inches, so as to leave a clear height of 8 feet 9 inches in the centre of the room, and to put round three sides of the room blocks of fir 3 inches by $1\frac{1}{2}$ inch, sloping to the same angle as the feet of the rafters, so as to cove the ceiling all round in a similar manner.

(This is an example of a roof with an imperfect tie, which would have been wholly inadmissable if the span of the roof had been more than 10 feet, unless in that case there had been sufficient abutments.)

Lintels.

To put to the several openings the requisite fir lintels, each $4\frac{1}{2}$ inches high, of the width required by the brick-work, and 18 inches longer than the bearing; and to provide and fix all requisite wood-bricks.

To fit up the window of the new parlour with $1\frac{1}{2}$ inch ovolo sashes, glazed with second crown glass, and double hung with large patent lines, brass axle-pulleys, iron weights, and patent spring fastenings, in a deal cased-frame, with an English oak sunk sill; and to fit up the same window on the inside with a pair of $1\frac{1}{4}$ inch bead-flush and square framed shutters, hung in the same manner as the sashes, in a proper cased-frame, with a moulding to form an architrave, and with $1\frac{1}{4}$ inch deal bead-flush three-panel window-back, with a beaded cover-board hung with 2 inch butt-hinges.

Windows.

To fit up the window of the new kitchen with a pair of 2 inch deal bead-butt and square sashed doors, with diminished stiles, glazed with second crown glass, and hung each with three $3\frac{1}{2}$ inch butt-hinges and a pair of strong dogs with sockets, in a fir proper frame 4 inches by 5 inches, let at bottom into the stone-work, and with a piece of 4lb. milled-lead 18 inches square wrapped round the bottom of each door-post; and to put to the sashed doors inch deal tongued and rounded linings, four strong 12 inch barrel-bolts, a Norfolk thumb-latch, and $1\frac{1}{4}$ inch bead-butt and square framed shutters with wrought-iron corner-shoes, stubbs, and plates, and strong thumb-screws.

Sashed doors from the shop.

To fit up the large opening from the shop to the new parlour with a pair of 2 inch deal square framed and bead-flush folding sashed doors with diminished stiles, glazed with second crown glass, and hung in 2 inch deal double-rebated linings, with 4 inch lifting butt-hinges, two 18 inch strong brass flush bolts, and a 6 inch best mortise-lock with good plain brass furniture; and to put round on each side of the doorway inch deal framed grounds 4 inches wide, with mouldings to form architraves.

Outer doors.

To fit up the external doorway of the parlour with $1\frac{1}{2}$ inch bead-flush and square framed four-panel inner door, hung with a pair of 3 inch butt-hinges, a pulpit-latch, and two 12 inch brass flush bolts, in 2 inch deal beaded and double rebated linings; and with a 2 inch deal bead-butt and square framed four-panel outer-door, hung with a pair of 4 inch rising butt-hinges, two 12 inch barrel bolts a pair of strong dogs with plates, and a 7 inch iron rimmed draw-back lock.

Closets.

To fit up the two recesses at the sides of the parlour fire-place with dwarf closets, with good inch Spanish mahogany tops, $1\frac{1}{4}$ inch deal framed moulded and beaded fronts and doors, the doors hung each with a pair of $2\frac{1}{2}$ inch butt-hinges and a good closet lock; each closet is to have a bottom and shelf of inch deal, and all requisite bearers and other fittings.

Skirting.

To put round the new parlour inch deal skirting 8 inches high, beaded on the top, and fixed with all requisite backings.

Stairs, &c.

To cut out, trim, and make good the floors, and construct according to the drawings a new staircase from the ground-story to the one-pair-story, and from the ground-story to the new kitchen, with $1\frac{1}{4}$ inch clean deal treads and risers, wrought on both sides, and housed into 2 inch deal wrought string-boards and wall-strings; to inclose the sides of the two staircases with $1\frac{1}{2}$ inch square framed partitions; and to put at the foot of the upper staircase and at the head of the lower staircase $1\frac{1}{2}$ inch square framed four-panel doors, hung each with a pair of $3\frac{1}{2}$ inch butt-hinges, and a good 7 inch iron-rimmed lock with

plain brass furniture; to put at the head of the one-pair-stairs strong balusters, hand-rail, and turned newel; and to put to the staircases inch deal beaded apron-linings, and all other requisite fittings and appurtenances.

Water-closets. To inclose the upper water-closet with 2 inch bead-butt and square framing, $1\frac{1}{4}$ inch bead-butt and square framed six-panel door, with the upper two panels thereof glazed with ground glass, hung with a pair of 3 inch rising butt-hinges a brass pulpit-latch, a small bolt and beaded stops; to fit up the insides of both the water-closets with inch clean deal seats, risers, and clamped flaps and frames, square skirtings 4 inches high, and all requisite bearers and pipe-casings; and to attend on the plumbers while fixing the basins and other work.

Dresser, &c. To put in the kitchen a dresser, with a top of 2 inch clean deal 2 feet 6 inches wide, free from sap-wood, and feather-tongued; framed legs and bearers, three drawers with brass drop handles, a strong good lock to the centre drawer; three $1\frac{1}{4}$ inch deal standards, three $1\frac{1}{4}$ inch deal sunk shelves, inch deal pot-board with bearers, and all requisite and usual other appurtenances.

Shop, &c. To take down and clear away the present staircase from the basement-story to the one-pair-floor of the premises, and also the partitioning on the ground-story, and the closet on the East side of the shop fireplace; to fill in to the sites of the said old staircase the timber floors with new fir of scantlings as great as those of the other timbers of the floors, to make complete the boarded floors thereto with $1\frac{1}{4}$ inch yellow deal clear of sap-wood; and to repair and make good all the other works injured or rendered incomplete by the said removal of the staircases and other works.

New shop-front, &c. To take down the whole of the present shop-front, and as much of the fittings and work therewith connected as may be found requisite; to alter and make good and complete the story-posts, breast-summer, and other timber-work of the shop-front, providing and using therein ten cubic feet of fir timber, and three cubic feet of English oak, all requisite oak

wedges, and all requisite shores and struts; to provide and fix a new shop-front according to the drawings, with 2 inch lamb's-tongue sash and fan-light, both glazed with the best Newcastle crown glass, 2 inch deal stall-board 18 inches wide, $1\frac{1}{2}$ inch bead flush framing under the stall-board.

Shutters.

(See p. 158.)

To provide and fix under the stall-board a pair of wrought-iron doors, consisting of bars and frame-work $\frac{3}{4}$ inch square; to provide and fix in the paving under the iron doors a pair of wrought-iron flaps, with bars 1 inch by $\frac{3}{4}$ inch not more than $1\frac{1}{2}$ inch apart, and frame-work 1 inch square, and to put to the iron doors and flaps fastenings value 20*s*., besides all requisite hinge-work; and to alter and make complete the curb of the cellar-entrance.

Jobbing-work.

To perform, in connexion with the works herein directed to be done, all such carpenter's work and joiner's work as may be requisite thereto in the nature of jobbing.

15 cubic feet extra fir timber.

To provide and apply under the contract 15 cubic feet of the best fir timber, to be used in such joists or other similar work as the architect shall direct, all additions to and all deductions from the quantity of the said extra fir timber which may be by the architect ordered to be used are to be taken at the rate of per cubic foot, including the labour and workmanship thereto.

Materials, &c.

All the carpenter's work and joiner's work (except where herein otherwise directed) are to be of the best Baltic yellow fir and Baltic yellow deal; the whole of the materials are to be well-seasoned, and free from sap-wood, shakes, large knots, and other defects: the joists, rafters, and ceiling-joists, are not to be respectively more than 12 inches apart.

Iron ties, &c

To provide and fix in and about the intended works $1\frac{1}{2}$ cwt. of iron in such straps, ties, bolts, and other light wrought and hammered work as the architect may direct; all additions to the said quantity and all deductions therefrom, are to be taken after the rate of per lb., including the fixing thereof.

PLASTERER.

Ceilings, &c. To lath, plaster, set, and whiten a ceiling to the new kitchen.

To lath, plaster, float, set, and whiten the ceiling and coved part of the new parlour, and to run round the crown and at the foot of the cove thereof a quirked bead one inch diameter.

Rendering. To render, set, and colour the sides of the new kitchen.

Stucco. To finish the sides of the new parlour, and the two niches at the sides of the parlour fire-place, with the best floated and troweled stucco.

To finish the sides and heads of the two niches with double quirked stucco beads.

Skirting. To run round the new kitchen a skirting of cement 1 inch thick, 8 inches high, and tinted stone colour.

Making good, &c. To repair, make good, and wash, stop, and colour the sides of the whole of the ground-story and of the other parts of the house which will be damaged by the execution of the intended works; and to make good and repair, wash, stop, and whiten the ceiling of the ground-story and the other ceilings which will be in like manner injured by the execution of the intended works.

PLUMBER.

Flashing, &c. To put at the head of the roof over the new parlour a flashing of 5lb. milled-lead 14 inches wide, let into the brick-work, and properly secured; and to put to the roof, at the part opposite the window of the one-pair back-room, a piece of 5lb. milled-lead 3 feet wide, turned up at the ends thereof, and dressed to the window.

Eaves'-gutter and pipe, &c. To put to the eaves of the roof over the new parlour, and to the back eaves of the roof over the present attic-story, 4 inch cast-iron troughs, put together with red lead and securely fixed on strong

wrought-iron brackets; to put from the upper eaves'-gutter to the head of the lower roof, and from the lower eaves'-gutter to the paving of the yard, cast-iron 3 inch rain-water-pipes with heads and shoes, and fixed complete; and to put over the slating of the lower roof, from the shoe of the upper pipe to the head of the lower pipe, a trough of $1\frac{1}{4}$ inch yellow deal 6 inches wide and 4 inches deep inside, and lined with 6lb. milled-lead.

Waste-pipe, &c. To put from the sink in the kitchen to the drain a very strong lead $2\frac{1}{2}$ inch waste-pipe, with a large brass bell trap-grating at the head thereof.

Water-closets. (See p. 105).

Cistern water supply. (See pp. 105 and 106).

Shop-front. To cover the cornice of the shop-front with 6lb. milled-lead turned up 6 inches high against the brick-work; and to put thereto a flashing of 4lb. milled-lead 5 inches wide effectually secured to the brick-work.

PAINTER, ETC.

4 times in oil. To knot, stop, prepare properly, and paint four times with the best oil colour, the whole of the intended new wood-work, iron-work, stucco-work, and the other works which are usually painted.

Flatting. To finish with flatting of such colours as may be directed the stucco-work and the wood-work of the parlour.

Colours, &c. of the shop-front, &c. To finish the sashes and the frieze of the shop-front with ; to finish the doors and the shutters in the best manner in ; to finish the remainder of the shop-front in ; and to varnish twice with the best copal the whole of the painting of the shop-front.

Jobbing-work. To repair and touch up all such of the painter's work of the house and premises as may by the execution of the intended works be injured, or be otherwise made defective or incomplete.

Glazing.

To take out of the windows of the one-pair story all the discoloured squares of glass now therein, and to re-glaze the same windows with sufficient new glass to match in colour the remainder of the glass. To make good all damage to the other glazing of the house and premises which may occur thereto by the execution of the intended works.

CHAPTER IX.

A SPECIFICATION *for* RE-BUILDING THE TWO FRONTS, *erecting* AN ADDITIONAL ATTIC-STORY *with a* LEADED FLAT *over the same, and for works to be done in the thorough repair of every part (the kitchen, and scullery, and the flat above the same only excepted) of a house situate at the corner of , and , for ; all which works are to be done under the direction of the architect who may be appointed, and according to the drawings signed with and forming part of the contract.*

BRICKLAYER.

Notice, &c., to district-surveyor, &c.

To give to the district-surveyor and to the other public officers the requisite notices, and pay to them their proper official fees and charges. (See p. 75).

Take down 2 fronts.

To take down to the under side of the intended new ground-flooring the whole of the front of the house next , and the whole of the front of the house next .

To sort carefully before any new brick-work is done all the old bricks to be taken down from the present work, and to cart away instantly from the premises all the rubbish and soft and broken and other defective bricks which the architect shall be of opinion are unfit to be again used in brick-work of a sound, proper, and workmanlike kind.

Repairs, &c., to the brick-work of the basement in cement.

To repair entirely with new, sound, grey stock-bricks, laid in a mixture of one-half cement and one-half clean Thames sand, all holes, cracks, and other defects in the brick-work of the entire basement-story; to alter and make complete with new grey stock-bricks, set in equal measures of cement and Thames sand, the areas as shown by the drawings, and all such parts of the basement-story as will of necessity require alteration in order to carry into effect the works according to the drawings; to turn arches in mortar over all the basement openings.

Alteration to chimney.

To alter and move the fire-place in the small south room on the ground-story, as shown by the plan.

Indents and chases, &c.

To cut quite perpendicularly and parget all indents and chases requisite for receiving the new brick-work; and to repair thoroughly, make good, and complete in a sound, neat, and workmanlike manner, all brick-work adjoining to the new brick-work, and which shall require any such work.

Brick-work to additional story.

To take down as far as may be requisite, by reason of intended alteration, unsoundness, or other cause, the walls and other brick-work of every kind of the upper part of the building; and to erect all the new brick-work represented by the drawings, and which may be necessary for completing the additional story to the building; the flue of the new chimney is to be properly turned, pargeted, and cored; the fire-place is to have a brick-trimmer; all the chimney-shafts, party-walls, and back-walls are to be finished with brick-on-edge and double plain tile cresting, both set in and jointed with cement; and each flue is to have a second sized chimney-pot set over the same with plain tile flanching in cement and Thames sand mixed together in equal measures.

Two new fronts.

To build to the house a new front next and a new front next as shown by the drawings, faced externally with the best second stocks of an uniform colour, jointed in the neatest possible manner, and with gauged arches 12 inches high, accurately cut, and set close at all the openings and blank recesses; the parapets are to be finished and set over in the manner shown by the drawings with two brick fascias 18 inches wide each.

To provide and put in the brick-work 2 cwt. of wrought-iron ties and hooping to secure the circular corner and the other parts of the house.

Bedding.

To bed and point with mortar all the plates, stone-work, and other things in or about the buildings which may so require, and to bed and point in lime-and-hair mortar all the window-frames.

Pointing, &c.

To rake out and point with blue mortar the two back walls as low as the roofs over the low buildings.

Bricks.

All the bricks to be used in or about every part of the work are to be new, approved, hard-burnt, square, grey stock-bricks of the best quality, except

the bricks of the external facings of the two fronts of the house, and except also such portion of the old sound bricks to be taken down from the present work as the architect shall approve of.

Mortar. The whole of the new brick-work (except where herein otherwise directed) is to be laid in and is to be flushed up at every course thereof, with mortar compounded in the proportion of one-third by measure of the best Dorking stone-lime, and two-thirds by measure of sharp Thames sand, properly beaten together.

Mode of doing the work. No four courses of brick-work are to rise more than one inch exclusive of the height of bricks. All the walls are to be scrupulously carried up in Flemish bond throughout their entire thickness, with all the heading-bricks, both of the malm and grey stock-bricks, carried through in order to prevent excuse for the bad union of two different kinds of bond; all the external joints are to be neatly struck and drawn. (See p. 78).

Rubbish. To clear away from time to time during the progress of the works all rubbish and useless materials of every kind, and finally to leave the house and premises clear therefrom.

Paving of cellars. To clear out the cellars, and relay and make good with sound stock-bricks all the broken and otherwise defective parts of the paving thereof.

Half a rod of brick-work extra. To provide and execute under the contract half a rod reduced of the best stock-brick-work in addition to the brick-work fully requisite to complete the premises, which extra brick-work is to be used in such further work as the architect may direct; the value of such part thereof as may not be required is, however, to be deducted from the amount of the consideration of the contract, after the rate of per rod reduced , and all further additional brick-work which the architect may direct is to be performed at the like price of per rod reduced.

Repair adjoining roofs. To make good the roofs of the adjoining premises so as to suit the intended alterations.

MASON.

Granite templets. To provide and bed beneath the ends of the new

girders of the ground-flooring, eight pieces of old granite curb each 3 feet long.

Granite sill to shop-front.

To put all along at the foot of the shop-front (except at the cellar entrance) a sill of new square parallel granite curb 12 inches by 8 inches, close jointed, fine worked, plugged with copper, and run with lead.

Coping.

To re-work the joints and re-work and throat the back and front edges of 25 feet run of the best of the present Portland stone coping of the parapets; and to provide new similar Portland stone coping sufficient for completing the covering of the parapets of the fronts next and next .

Window-sills.

To put to the new back windows two of the old stone sills; to put to all the windows and blank window recesses in the two new brick-fronts, sunk, weathered and throated sills of Portland stone, 8 inches by $3\frac{1}{2}$ inches.

Chimney-pieces.

To put to the fire-places of the attic-story $1\frac{1}{4}$ inch Portland stone jambs, mantles, and shelves, each 5 inches wide, $1\frac{1}{2}$ inch Portland stone slab 1 foot 6 inches wide, and Yorkshire stone back-hearth.

To repair and re-set the chimney-piece of the two-pair west room, and to put a new $1\frac{1}{2}$ inch Portland-stone slab, and a Yorkshire stone back-hearth to the same fire-place.

To clean the marble chimney-piece of the one-pair west room.

To repair and re-fix the chimney-pieces of the small south rooms on the one-pair-story and the ground-story.

Public paving.

To defray all expense attendant upon making good to the satisfaction of the proper officer the public pavings affected by the execution of the works.

Holes, &c.

To cut all requisite holes and notchings, and to perform all the other usual work requiring the hand of a mason.

SLATER.

(If any slating, see p. 81).

CARPENTER AND JOINER.

Hoarding and shoring.

To erect and maintain sufficient hoarding for inclosing the house during the carrying on of the works, and to remove and take away the same when so directed.

To shore up in a judicious, safe, and workmanlike manner, the several floors and other parts of the premises so requiring from the nature of the intended works; and to shore up in like manner all adjoining premises.

Materials.

To provide all requisite materials for, and to frame and fix all carpenter's work and joiner's work of every kind (with all proper ironmongery of the very best quality complete) which may be requisite for carrying into effect and for completing the building and works according to the drawings and this specification, and to render the premises complete and perfect. None of the old materials are to be used again except the same be sound in the opinion of the architect, and suitable for the work. All deficiency in the materials is to be made up by new timber and deal. All the requisite oak timber is to be of English growth; all the other timber is to be either Dantzic, Riga, or Memel yellow fir. All the floors and joiner's work are to be of the best Christiana deal, except where herein otherwise directed. All the timbers and deal are to be cut die square and perfectly free from the least sap-wood in any part, and from shakes, large knots, and all other defects. None of the rafters, quarters or joists are to be respectively more than 12 inches apart.

Centering.

To provide, fix, ease when so directed, and finally remove all the centering and turning pieces which may be requisite for the arches of every kind.

Sundries.

To provide and fix 2 cwt. of wrought-iron in such ties, bolts, straps, and other works, as may be by the architect directed, in order to secure the floors, roof, and other parts of the works. (See p. 82).

To provide and fix all requisite templets, blocks, stops, linings, casings, fillets, springing-fillets, beads, angle-staves, grounds, backings, furrings, cappings, and other fittings and finishings necessary, usual, and appropriate to carpenter's work and joiner's work; and to perform all needful grooving, rebating, tonguing, framing, mitring, housing, beading, and other labour and workmanship proper and necessary to wood-work.

Floor of ground-story.

To put to the ground-story a new timber-floor as shown by the plan of the basement-story, at the same level as the floor of the small southern room, with joists 7 inches by $2\frac{1}{4}$ inches, corked and housed upon one plate 4 inches by 4 inches, two fir girders 13 inches by 9 inches, and one fir girder 13 inches by 6 inches, with 12 inch wall-hold at each end; each end of each girder is to be boxed up over the part thereof, set in the wall with a cast-iron socket weight 40lbs., in order to prevent saturation to the timber from the ground.

To lay the whole of the shop with new $1\frac{1}{2}$ inch yellow deal, wrought floor listed free from sap-wood, and rebated and filleted; to relay and make good all the other flooring-boards and finishings and works disturbed by putting in the new timber floor.

Floor of new attic.

To take off the present roof and ceiling-floor over the two-pair-story of the house, and to put a new wall-plate 4 inches by 4 inches with an angle-tie 7 feet long, scantling 6 inches by 3 inches at the external corner, joists 10 inches by 2 inches, trimmers 10 inches by $2\frac{1}{2}$ inches and one tier of herring-bone struts; and to lay the whole of the attic-story with inch white deal half-boards.

Other floors.

To raise up level as far as practicable, when the old front walls are taken down, all the other floors; to put in the new brick-work, new fir plates, and angle-ties as described to the attic-story; to make good all the unsound timbers then discovered, and to relay and make good to the new brick-work with the requisite new materials all the boarded floors of every kind.

To put 50 feet superficial of new inch deal floor to the two-pair-story and one-pair-story in addition to that requisite against the new brick-work; and to

repair in a workman-like manner all the other parts of the floors throughout the house.

Wood-bricks. To put in the brick-work all wood-bricks requisite for fixing the finishings and other works in need thereof.

Lintels. To put over the window of the small attic a fir lintel 6 inches by 9 inches; to put over each of the other windows in the new brick-work a fir lintel 4 inches by 9 inches.

Flat over the attic-story, &c. To construct the flat over the attic-story according to the drawings, with wall-plate $4\frac{1}{2}$ inches by 3 inches; angle-ties, each 5 feet long, 4 inches by $2\frac{1}{2}$ inches; one pair of gutter-plates, each of the pair 12 inches by 6 inches; one pair of gutter-plates, each of the pair 12 inches by $2\frac{1}{2}$ inches; and joists average scantling 12 inches by 2 inches, but cut out of the solid so as to have a current of $1\frac{1}{2}$ inches in 10 feet.

To frame between the gutter-plates bearers to a current $1\frac{1}{2}$ inch in 10 feet, and lay the same with inch yellow deal; and to lay the flat with inch yellow deal listed free from sap-wood.

To form in the roof a dormer 3 feet 6 inches high, with frame-work inch yellow deal boarding with proper ledged trap-door and outer door, hinges, fastenings, linings, step-ladder, and all other fittings complete.

To alter, make good, and adapt to the circumstances of the case as may be requisite, the gutters and roofs to the adjoining premises.

Quartered-partitions. To construct the quartered-partitions of the attic-story as shown by the drawings, with plates 4 inches by 4 inches, end-posts, door-posts, door-heads, braces, king-posts, and queen-posts, 4 inches by $3\frac{1}{2}$ inches, quarters 4 inches by 2 inches, and inter-ties $2\frac{1}{2}$ inches by $1\frac{1}{4}$ inches. (See p. 84).

The principal quartered-partition is to have a wrought-iron tie 2 inches by $\frac{1}{2}$ inch the whole length along the bottom plate thereof, with a corking 12 inches long let through the whole thickness of the brick-work at each end of the same.

Shop-front.

Breast-summers in two widths, each 12 inches by 6 inches, bolted together with wrought-iron flitch; 4 story-posts jointed in lead at the top, 12 inches by $4\frac{1}{2}$ inches, 4 cast-iron socket-bases, 6 inches high for ditto, weight each 20lbs. Breast-summer to extend along the whole length of the side of the shop next , and to be framed at the external angle of the house to the other breast-summer, but to remain hidden in the brick-work 13 inches by 10 inches wrought-iron straps and bolts for securing the breast-summers, weight 112lbs., 2 inch stall-board 12 inches wide, 2 inch deal lamb's-tongue sashes, half one sash to be hung with lines and weights; inch Honduras mahogany fascia to show 18 inches wide, with cradling complete; moulded cornice with cast-iron enrichment; $1\frac{1}{4}$ inch deal pilasters with moulded capitals; moulded impost at the stall-board; inch deal tongued and beaded casings to the breast-summer and story-posts; all requisite stops and other fittings; and the present folding-doors and the cellar-doors to be repaired and re-hung in proper fir frames 5 inches by 4 inches.

Shutters.

(See p. 158).

To put over the folding-doors a panel of open iron-work as shown by the elevation.

To complete the lining of the shop with $\frac{3}{4}$ inch deal matched and beaded, and fixed with the requisite backings.

Areas, &c.

To repair and alter according to the drawings the situations of the cellar-flap and area-grating with the frames thereto.

Windows.

To put to the attic-story $1\frac{1}{2}$ inch ovolo sashes, double hung with large patent lines, iron weights, and iron axle-pulleys, and patent spring-fastenings, in deal cased-frames with oak sunk sills; and to put to each of the attic-windows inch tongued beaded and quirked linings and window-boards.

To put to the two-pair-story one new window as described for the attic-story.

To repair thoroughly all the remainder of the sashes and frames throughout the premises; to re-hang the whole thereof, with new large patent lines,

and the requisite new pulleys, fastenings, and other proper work and fittings.

To repair thoroughly, adapt, re-fix, and make good, all the shutters, linings, and other fittings of the windows affected by the alterations and new work.

New doors, &c. To put to the whole of the attic-story, new $1\frac{1}{2}$ inch square framed four-panel doors hung complete with 3 inch butt-hinges, and good 6 inch iron rimmed locks with plain brass furniture, in $1\frac{1}{4}$ inch single-rebated linings, with ogee moulding to form an architrave all round on both sides of each door.

Skirting. To skirt the whole of the new attic-story with $\frac{3}{4}$ inch square skirting $6\frac{1}{2}$ inches high, plugged to the walls.

Staircase. To take down the present attic staircase, and erect in lieu thereof a new staircase according to the drawings, with inch yellow deal treads, risers, and landings, on strong bracketed fir carriages, $1\frac{1}{4}$ inch wall-string and outer strings, deal moulded hand-rail, square bar balusters, all requisite apron and other linings of inch deal, and all requisite other fittings of every kind.

To batten with inch yellow deal for plastering the walls of the two-pair-story of the staircase.

Entrance passage, &c., &c. To board the North-west side of the entrance-passage with inch rebated and beaded linings 5 feet high, with beaded capping on the top thereof; and to put outside the door a mitred architrave, inch yellow deal tongued side linings, and other fittings as shown by the drawings.

General repairs. To repair and re-hang the folding-doors of the two-pair West-room, and to repair the linings of the entrance-door of the same room.

To repair the defective panels of the wainscoting over the one-pair West-room fire-place; and to repair and re-hang the doors of the closet on the one-pair landing of the staircase.

To repair thoroughly, ease, re-fix, and, where re-

quisite, re-hang with new hinges and the other proper work, the doors and shutters of every kind throughout the premises.

To carefully examine the whole of the internal and external wood-work of the entire dwelling-house, and wherever there is any decay, unsoundness, or other defect therein, to repair, remedy, and make good, all such decay, unsoundness, or other defects, in the most secure, neat, and workmanlike manner.

To prepare all the work of every kind for the painters; to secure all loose skirtings, linings, and other finishings.

Re-instatement of fittings to the new fronts.

To re-instate, adapt, make perfect, and complete all the wainscoting, cornices, and other wood-work and fittings of every kind, which will be disturbed, injured, affected, or in any way of necessity altered by reason of the re-building of the two new fronts to the house, and by reason of the performances of the works.

Ironmongery

To take off the whole of the locks and other fastenings of every kind throughout the house; to clean, repair in the most perfect manner, and re-fix such thereof as will turn out to be worth the same, and to re-instate by new ironmongery of the best quality all deficiency in the present ironmongery. To fit to the locks new keys wherever the old keys are lost or are imperfect.

To take off, repair, lacquer, and re-fix all the sound brass-work of every kind throughout the house, and to provide and fix new plain brass-work of the very best quality for all deficiencies in the old brass-work, and for every other part of the premises requiring brass furniture.

25 ft. cube fir timber.

To provide and fix under the contract 25 feet cube of fir timber in addition to the materials requisite for completing the premises, to be used as joists, rafters, or quarters, in such further work as the architect may direct, the value of such part thereof as may not be ordered by the said architect to be used, is, however, to be deducted from the amount of the consideration of the contract, after the rate of per foot cube, and to provide and fix at the like price of per cubic foot all

such further additional timber in joists, rafters, or quarters, as the architect shall direct to be used.

PLASTERER.

L. P. S. ceilings, &c. To lath, plaster, and set the ceilings and the strings of the stairs of the whole of the attic-story and of the two-pair-story, and all the quartered-partitions and the sides of the staircase at the two-pair story.

Rendering. To render and set the whole of the brick-work of the attic-story, and of the large closet of the two-pair-story.

L. P. F. & S. ceilings. To put to the strings of the old staircase, and to put to the large room on the one-pair-story, new lathed, plastered, floated, and set ceilings.

W. & S. To wash, stop, and repair thoroughly, all the other plastering of every kind throughout the house.

Whiting and colouring. To whiten all the ceilings and the strings of the stairs throughout the house; and to colour of such tints of stone-colour as may be directed all the other plastering of the house.

SMITH AND PLUMBER.

6lb. milled-lead flat and gutters. To lay the whole of the roof and gutters over the attic-story with milled-lead, weight 6lbs. to the foot superficial, joined with rolls as shown by the plan, and turned up 5 inches high all round next the brick-work.

4lb. milled-lead flashings. To put in the brick-work all round the flat 4lb. milled-lead flashings 5 inches wide.

5lb. milled-lead to dormer and shop-front. To cover the dormer all over with 5lb. milled-lead, properly secured and dotted, and to cover the shop-front with similar lead 10 inches wide, with a flashing as to the flat.

4 inch rain-water-pipe, &c. To put from the upper roof to the flat over the low building a complete stack of 4 inch cast-iron rain-water-pipe, fixed with shoe and head to receive the water from the two gutters.

Adjoining gutters, &c. To relay and make good as far as may be requisite, on account of the intended works, the adjoining gutters

of the house in and of the house in ; and to put a branch pipe to convey the water from the adjoining lower roof into the other pipe.

Grates. To provide and set in each new room a grate, average price £1.

PAINTER.

Preparations. To knot, stop, prepare properly, pumice smooth in every part thereof, burn off where requisite, and bring to an uniform surface, all the works intended to be painted.

Twice, &c. in oil. To bring forward with the requisite number of coats of colour, and paint in the the best manner twice with the best oil-colour, the whole of the old works usually painted, and those works which have been altered or repaired, both of the inside and of the outside of the premises.

Four times in oil. To paint four times with the best oil-colour all the new wood-work, iron-work, and other works usually painted, both of the inside and of the outside of the premises.

Flatting. Flat with two plain tints to choice the whole of the wood-work of the large room on the one-pair-story, and the outside of the entrance door of the same room.

GLAZIER.

Best glass. To glaze the windows of the shop-front with the very best British plate glass.

2nd glass. To glaze all the other new sashes and lights of every kind with good second Newcastle crown glass.

Repairs. To cut out and make good all the squares of glass of the whole house that are cracked.

Repair old putty. The whole of the old glazing is to be puttied where requisite.

Clean, &c. glass. The whole of the new glazing is to be properly bedded, bradded, and back-puttied; and all the glazing is to be cleaned and left perfect at the rendering up of the premises as complete.

CHAPTER IX.

SPECIFICATION OF THE ARTIFICERS' WORKS *to be done in the general reparation of the Houses, Buildings, and Premises, Nos.* , WHICH HAVE BEEN CONDEMNED *as ruinous, including new party-walls thereto, and for the performance of other works connected with the said premises.*

BRICKLAYER.

Notice, &c., to district-surveyor, &c., &c.

To give to the district-surveyor all the requisite notices, and to pay to him his proper official fees; to obtain all requisite licenses from the Surveyor to the Local Board and other public officers, and to pay all official dues and charges of every kind attendant thereon.

Digging, &c.

To perform all digging and removal of ground which may be requisite for the execution of the several works intended to be done under this specification; to fill in the ground as far as may be requisite to the several parts of the premises; and to remove and cart away all the superfluous earth and ground remaining after the premises have the ground filled up to the proper levels.

Rubbish, &c.

To clear away from all the buildings and premises at which the several works are intended to be done all rubbish and useless materials from time to time as the same may arise from the performance of the various works; and to leave finally the whole of the said buildings and premises free therefrom.

Concrete.

(See p. 75).

New party-walls.

To erect to the North side of the house No. and to the North side of the house No. new party-walls of the several thicknesses shown on the sections, and with chimneys therein of the dimensions shown by the drawing, composed entirely of the best new grey stock brick-work, and finished on the tops thereof with brick-on-edge and double plain tile cresting, both set in and jointed with new quick

cement and clean Thames sand mixed together in equal measures.

Chimneys. To take down and remove altogether the chimney-stack of the house No. ; to take down all the other old chimney-shafts of the premises; and to rebuild the whole thereof to the same height as at present, using only such of the present bricks as shall be found to remain sound, and providing and applying in and about the same work sufficient additional new hard grey stock-bricks of the best quality. To finish all the new chimney-shafts with salient-courses 6 inches high, and to put over each flue a sound chimney-pot set in plain-tiles and cement and sand (as described for the tops of the intended new party-walls), and using the present chimney-pots as far as sound and undecayed, and providing for all deficiency new first-sized chimney-pots.

Under-pin. To under-pin carefully with sound new hard-burnt grey stock-bricks, set in equal measures of the best new quick cement and clean Thames sand, the whole of the present old chimney-stacks of the premises; and to examine, repair, point, and make complete where requisite, all the other parts of the chimneys, and to carefully under-pin the walls coloured a blue tint on the basement wall, so as to reach a sound and good foundation.

To put to each of the fire-places of the houses Nos. a 4 inch brick trimmer 12 inches longer than the chimney-opening. To lower, diminish, and otherwise alter as may be found requisite, the fire-places in the South party-wall of the house No.

Fore fronts of the five houses. To cut out all the defective bricks to the settlements in the fronts next of the houses; to repair and make good and complete, in a workmanlike manner, the whole of the defects in the same fronts, with the best new grey stock-bricks; to rake out the mortar from the whole of the joints of the fronts of the houses, to colour and flat-joint point with the best stone-lime dark coloured mortar the whole of the same fronts; and to re-set in cement and make complete the copings of the same fronts.

End wall. To inclose the South side of the house No. from the party-wall to the fore front of the house

with a new wall of the best grey stock brick-work, as described for the intended new party-walls, and faced externally with picked stocks of a bright uniform colour; the said wall is to have two courses of footings three bricks thick, and two courses of footings two and a half bricks thick, the whole of the footings being 6 inches below the basement-paving, and the said wall from thence to the under side of the ground floor is to be two bricks thick, and is to be one brick and a half thick from thence upwards.

Back fronts, &c. To repair and make good where defective with the requisite new grey stock-bricks, all the brick-work of the backs of the houses, and all the brick-work of the building projecting from the rear of the same houses; and to rake out the defective mortar from all the joints thereof, and to point with stone-lime blue mortar the backs of the houses and other brick-work above-mentioned, where requisite, in order to render the brick-work complete and perfect.

Bedding, &c. To bed in mortar all the plates, lintels, templets, and other timbers and works so requiring; to bed and point with lime-and-hair mortar all the new door-frames and window-frames, and all the other door-frames and window-frames requiring to be bedded or pointed; to back up with solid brick-work to all the timbers, stone-work, and other things set or to be set in the brick-work.

Indents, &c. To cut and parget in the old adjoining brick-work proper perpendicular indents wherever requisite in order to receive the intended new brick-work; and to make good in a workmanlike manner all the shattered and defective brick-work uniting with the intended new work.

Paving. To pave the yards of the several houses with hard stock-bricks laid flat in mortar and grouted between the joints with liquid mortar.

Tiling. To strip off the whole of the tiling of every kind from all the roofs of the houses Nos. and from all the roofs of the out-buildings thereof; to select from the present old tiling (in order to be used again), such tiles only as remain sound, unbroken, and undecayed; to remove and cart away from the premises all the defective tiles; to re-tile the whole of

the aforesaid roofs upon new heart of fir strong double laths, using the present sound tiles when selected as above-stated, and providing and applying in the tiling additional new sound tiles, sufficient for making up all deficiency in the old tiles, and to complete the whole of the tiling; all the plain-tiling is to be laid in stone-lime-and-hair mortar of the best quality, each plain-tile is to be secured by a peg, each ridge-tile and each hip-tile is to be secured by a T nail dipped in pitch, and each hip is to have a proper wrought-iron hip-hook dipped also in melted pitch, and all the tiling is to be filleted next all the brick-work with cement and Thames sand mixed in equal measures, strong cast-iron nails being first driven into the brick-work not more than 3 inches apart to secure the same.

Drains, &c.

To open, cleanse, and make perfect the principal drain at present running from North to South through the yards of the premises, and to perform in addition to the above drainage-work such other drainage-work, to the full value of 10*l*., as the architect shall direct. (For any new drains, see p. 77).

Water-closets.

To repair thoroughly the brick-work of the present two water-closets, and to form and execute the requisite brick-work for the two intended new water-closets of the houses Nos.

3 rods extra brick-work.

To provide and execute under the contract for the performance of the works three rods reduced of the best grey stock brick-work, laid in stone-lime mortar (and of the same quality as the other brick-work in this specification described), to be used in such additional works as the architect may direct in addition to the brick-work fully requisite for the thorough completion of the intended new walls, and the other intended works, and the intended repairs and the appurtenances thereof; the value of all such of the quantity of the said extra three rods reduced of brick-work as may not be directed by the architect to be so used, is, however, to be deducted from the amount of the consideration of the contract for the execution of the works after the rate of per rod reduced; and in like manner to provide and execute such further additional brick-work of the description last described as the surveyor shall direct at the price of per rod reduced.

Bricks. All the bricks to be used in and about the intended works to the several houses, buildings, and premises, are to be (except where herein otherwise directed) the very best new approved hard-burnt square grey stock-bricks, free from breakage and from all admixture of soft bricks, place-bricks, or other inferior bricks.

Mortar. The whole of the mortar to be used in the brick-work is to be compounded in the proportion of one third by measure of the best stone-lime, and two thirds by measure of clean sharp Thames sand properly beaten and worked up together.

Mode of doing the work. No four courses of the brick-work are to rise more than one inch besides the height of the bricks; all the brick-work is to be carried up in every part and through the entire thickness thereof with English bond; every course of the brick-work is to be filled in and to be fully flushed up with mortar; and every alternate course of the work is to be thoroughly grouted with liquid mortar. (See p. 78).

Scaffolding. To provide, maintain, alter as occasion may require, and finally take down, remove, and cart away from the house, buildings, and premises, all scaffolding which will be requisite for the performance of the whole of the intended works of every kind of all the several houses, buildings, and premises, and with sufficient poles, cords, wedges, ropes, planks, ladders, tackle, and all other proper appurtenances.

Jobbing-work. To perform all bricklayer's work of every kind which may be requisite in the nature of jobbing to the several houses, buildings, and premises, and to the appurtenances thereof.

MASON.

Corbels. To put in the South party-wall of the house No. a corbel for the support of the end of each girder of the floors, each corbel is to be composed of a piece of granite curb 7 inches by 10 inches and 18 inches long.

Chimney-pieces, &c. To put to each of the fire-places of the houses Nos. jambs, mantle, and shelf, each of $1\frac{1}{4}$ inch Portland stone 6 inches wide; and to put

to each of the same fire-places a back hearth of $2\frac{1}{2}$ inches rough Yorkshire stone, and also a chimney-slab or front-hearth of 2 inch Portland stone 18 inches wide and 18 inches longer than the chimney-opening.

To repair and make good with the requisite new jambs, mantles, and other work, the whole of the present chimney-pieces of the houses Nos. ; and to repair, relay, and make good as far as requisite the whole of the hearths, foot-paces, and slabs thereof, not however renewing those hearths, foot-paces, and slabs which are merely cracked.

Paving. To pay to the proper local authorities the expense of relaying and making good all the public paving which will be disturbed, injured, or affected by the execution of the intended repairs and works; and to relay and make good all the pavings belonging to the several houses and premises which will be taken up or which will be injured by the execution of the intended works.

CARPENTER AND JOINER.

New Materials, &c. To provide sufficient new materials for, and frame and fix all carpenter's work and joiner's work of every kind, which may be requisite for carrying into effect and for finishing and completing the intended works and repairs to the several houses, buildings, and premises, Nos. ; and to fix in and about all the said carpenter's work and joiner's work all proper and necessary nails, spikes, hold-fasts, wall-hooks, screws, and other ironmongery of the very best quality.

Timber and deal. (See p. 82).

Sundries. (See p. 82).

Centering. (See p. 97).

Hoarding shoring, &c. To provide, maintain, alter as occasion may require, and finally remove, safe and close hoarding sufficient for the inclosing of all the houses, buildings, premises, and building-materials, during the performance of all the intended works; to provide, set up, maintain, and finally remove, such bridge-ways and other accommodation for passengers as the proper

authorities may during the progress of the works require. To provide, fix, and maintain, to every part of the houses, buildings, and premises upon which the intended works are to be executed all shores, braces, needles, and wedges, and other materials, works, and appurtenances proper to, and fit for complete and safe shoring, and which may be necessary to the said several houses, buildings, and premises, in order to perform properly the intended works and alterations thereto; and to shore up and secure by the like means, as far as may be necessary in consequence of the performance of the said works and alterations, all the premises of every kind which adjoin or communicate with any of the aforesaid houses, buildings, and premises, or which may be in any manner endangered by the execution of the intended works.

All the shores and all the hoarding at present set up to the five houses are to become the property of the contractor.

Wood-bricks.

To put all wood-bricks requisite for fixing properly the joiner's works and other work in need thereof.

Wall-plates.

To put in the new brick-work the requisite wall-plates for the floors and roofs, of new fir scantling 4 inches by 4 inches properly scarfed.

To take up all the flooring-boards of the ground-story (those to of the house No. excepted); to use the sound parts of the same flooring-boards in repairing the attic-floors of the five houses, and to provide and apply in addition thereto new inch white deal wrought flooring-boards sufficient for repairing and completing the whole of the said attic-floors. To lay to the whole of the ground-story of each house (the of the house No. excepted) entire new boarded floors of inch white deal wrought and laid folding; to repair and make complete all the other boarded floors of the five houses and of the other buildings and premises, providing and applying therein at least ten squares superficial of inch white deal wrought flooring-boards. The whole of the flooring-boards are to be fixed with the requisite firrings.

To repair, re-frame, and re-fix as far as requisite,

and make complete all the timber-work of the several floors of the five houses, using in and about the said work at least 200 cubic feet of new fir in such joists and other timbers as may be by the architect directed.

Roofs. To repair thoroughly, re-frame, re-fix, and fir up where requisite, and make complete, the whole of the wood-work of the roofing of the five houses and of the out-buildings thereof, providing and applying in and about the said work 75 cubic feet of new fir timber at the very least, in such rafters, ties, plates, beams, and other work as the architect may direct; to take away the flat over the house No. . and to put instead thereof a span roof similar to those of the other houses; to take up all the guttering of the whole of the roofing, and to put entire new gutters of inch yellow deal clear of sap-wood, laid on strong yellow deal bearers to currents $1\frac{1}{2}$ inch to every 10 feet run, and with $2\frac{1}{2}$ inch drips, so disposed as that no sheet of lead shall be more than 16 feet long, and no part of the guttering is to be less than 9 inches wide; to put against the rafters at the sides of all the gutters lear-boards of $\frac{3}{4}$ inch yellow deal $8\frac{1}{2}$ inches wide; to put to the whole of the roofing the requisite springers, tilting-fillets, and other proper and usual work.

Repair Dormers. To repair thoroughly the dormers; to put thereto new inch deal ledged outer trap-doors, hung with strong cross-garnet hinges and with a bolt to each; and to put beneath each dormer an inner trap-door similar to the outer trap-door, and with the like hinges and bolts.

Skylight. To put over the staircase of the house No. , a $2\frac{1}{2}$ inch yellow deal sky-light containing 20 feet superficial, with inch deal linings and all proper fittings complete.

To repair thoroughly all the remainder of the wood-work of every kind connected with the roofing of the five houses and of the out-buildings thereof, providing the requisite new materials.

Partitions. To repair thoroughly and re-fix as far as requisite the several timber and framed partitions of every kind of the whole premises, putting thereto new

timbers, panels, stiles, rails, and the other needful work in lieu of such of the timbers, panels, stiles, rails, and other work thereof, as are either lost or are defective.

To inclose the intended new staircase of the house No. , and two closets on each story adjoining to the same staircase, with quartered-partitions with plates 4 inches by 4 inches, end posts, king-posts, door-posts, and door-heads 4 inches by $3\frac{1}{2}$ inches, braces 4 inches by 3 inches, quarters 4 inches by 2 inches, and two tiers of inter-ties to each story 2 inches by $1\frac{1}{4}$ inch.

400 feet superficial new $1\frac{1}{2}$ square framed partitions, door, &c.

To provide and fix in the situations which the architect may direct, in addition to the other partitions and doors of the houses, buildings, and premises, 400 feet superficial of $1\frac{1}{2}$ inch square framed partitions, with ten four-panel square framed doors therein, with beaded stops, and hung each with a pair of 3 inch butt-hinges and a 6 inch iron rimmed good lock, with plain brass furniture.

Skirtings, &c.

To restore and make good, with the requisite labour and new materials, the skirtings and other wood-work to the new brick-work, so as to correspond properly in the several parts of the houses, buildings, and premises with the other skirtings and other wood-work thereof.

Story-posts, breast-summers, shop-fronts, &c.

To examine carefully the several story-posts and breast-summers of the five houses; to perform all work and labour requisite in the reparation thereof; and to use in and about the said work 10 cubic feet at the least of new Baltic fir.

To repair thoroughly in a workmanlike manner and make complete all the sashes, shutters, fascias, pilasters, linings, and other wood-work of every kind belonging to the shop-fronts and to the other wood-fronts next ranging and connected therewith.

To repair and make complete the bars and other fastenings and iron-work of the shop-front shutters.

To alter the shop-front of the house No. , and to complete the same with a new $2\frac{1}{2}$ inch bead-

flush and square framed sashed door hung with three 4 inch butt-hinges, a bead-flush and square shutter, and all other requisite fittings and appurtenances.

Doors, &c.

To take off, repair thoroughly, and re-hang with the requisite new hinges and other fittings, the whole of the doors and gates of every kind belonging to the whole of the houses, buildings, and premises, and to provide and hang in the several houses, buildings, and premises, new doors to correspond in quality severally with the next adjoining doors, in lieu of such doors as are either lost or are so defective as not to be worth reparation.

New windows.

To provide and fix in such parts of the premises as shall be by the architect directed, one hundred and fifty feet superficial of new 2 inch ovolo sashes, double-hung with large patent lines, brass axle-pulleys, iron weights, and patent spring fastenings, in proper deal cased-frames with English oak sunk sills.

Old windows.

To repair thoroughly in a workmanlike manner and make complete all the other windows, lights, casements, and window-frames of every kind throughout the whole of the houses, buildings, and premises; and to re-hang with large patent lines and the requisite hinges and other fittings and proper appurtenances, the whole of the sashes and casements thereto.

To repair and make good all the linings and other fittings of the windows of all the houses and premises; and to repair, ease, and re-hang such of the window-shutters as stand in need thereof.

Staircases.

To erect in the centre of the house No. , a new staircase from the ground-story upwards to the attic-story, with treads, landings, and risers of $1\frac{1}{4}$ inch yellow deal on strong bracketed carriages, $1\frac{1}{4}$ inch string-boards and wall-strings, framed and turned newels, $3\frac{1}{2}$ inches by $3\frac{1}{2}$ inches, turned balusters 1 inch diameter, strong deal moulded hand-rails, inch deal apron linings, and all other proper fittings and appurtenances.

To repair thoroughly the staircase of the house

No. , putting thereto entire new treads and landings of inch deal and the other requisite work; to repair thoroughly the other staircases of the houses, putting new nosings 3 inches wide to the whole of the treads and landings thereof; and putting thereto also the other requisite work; to repair and make complete all the balusters, hand-rails, newels, and other fittings of the several staircases, and to re-instate such of the fittings of the staircases as are lost.

Water-closets.

To repair thoroughly the wood-work of the water-closets of the houses No. , and to provide and fix at the premises of the houses Nos. , wood-work and fittings for two water-closets, in quality similar to those of the other water-closets.

Dressers and other fittings.

To repair thoroughly and make complete all the dressers, shelves, closets, and other internal fittings of the several houses, buildings, and premises, and to provide and fix therein, where the architect shall direct, additional new fittings to the full value of £10.

Repairs, &c., to the other work.

To repair and make complete in a workmanlike manner all the other old carpenter's work and joiner's work of every kind (not herein before particularized) belonging to the whole of the houses, buildings, and premises, Nos. ; and to prepare properly for painting all the wood-work usually painted.

Ironmongery, brass-work, &c.

To take off all the present locks, fastenings, ironmongery, and brass-work of the whole of the houses, buildings, and premises; to clean, repair, lacquer, and re-fix such thereof as may remain sound and fit to be again used; and to provide and fix sufficient new ironmongery and brass-work of the best plain quality to make up all deficiency in the old ironmongery and brass-work.

Jobbing work.

(See p. 103).

150 cubic feet extra fir timber.

To provide and fix under the contract for the execution of the works, one hundred and fifty cubic feet of the very best Baltic fir timber, clear of sap-wood and all other defects, to be used in such additional rafters, quarters, joists, or other unplaned timber-work as the architect may direct to be used, in addition to the timber-work fully necessary for the thorough completion of the intended repairs and work,

the value of all such of the said extra fir timber as may not be directed by the surveyor to be so used, is, however, to be deducted from the amount of the consideration of the contract for the execution of the works after the rate of per cubic foot, and all further additional timber work of the like kinds which the surveyor shall direct to be used is to be provided and fixed by the contractor at the like price of per cubic foot.

SMITH.

Chimney-bars. To provide for each of the intended new fireplaces of the houses Nos. , a wrought-iron chimney-bar $2\frac{1}{2}$ inches by $\frac{1}{2}$ inch properly corked at the ends thereof, and at least 20 inches longer than the chimney-opening.

Provide 10 cwt of iron. To provide and fix 10 cwt. of iron in such straps, ties, stirrup-irons, screw-bolts, nuts, washers, and other light wrought and hammered work as may be by the architect ordered for the several houses, buildings, and premises, and to make all alterations requisite thereto; all additions to, and all deductions from the said quantity of 10 cwt. of wrought-iron work is to be taken after the rate of per lb. avoirdupois, including the fixing thereof.

PLASTERER.

New ceilings and strings. To put to the whole of the ground-story and to the whole of the upper-story of each of the five houses, to the one-pair-story of the houses Nos. , and to the new staircase of the house No. , new lathed, plastered, and set ceilings and strings of the staircases. The present laths may be used again as far as sound, unbroken, and undecayed.

To make good in a similar manner the portions of the other ceilings which on account of the building of the new party-walls will so require.

New rendering and setting. To render and set all the new internal brick-work of the five houses.

Old plastering. To cut down the defective lathing and plastering, and to wash, scrape, stop, and repair thoroughly, and

make good the lathing and plastering of every kind to the whole of the remainder of the five houses and premises.

Whiting. To whiten the whole of the ceilings, strings, and plaster cornices, of the five houses and of the out-buildings, thereof.

Colouring. To colour the sides of the whole of the interior of the five houses, and of the out-buildings thereof.

(For plumber, painter, and glazier, see specifications *ante*.)

CHAPTER X.

REPAIRS TO BE DONE *in and about the* ROOF *of the House and Premises situate and being*

BRICKLAYER.

District-surveyor, &c. (See p. 75).

(If the repair be considerable, including new brick-work, notice must be given to the district-surveyor.)

New chimneys. To take down to as low as the roof (or insert as much lower as may be necessary and as the case may require) the South-western chimney-shaft and the chimney-shaft next , and to rebuild the same chimney-shafts, using again only the sound old bricks after the same have been properly cleaned, and providing sufficient new hard grey stock-bricks in order to face the new chimney-shafts wholly with new bricks, and to make up all deficiency in the quantity of the said old bricks.

Old chimney-shafts. To rake out the mortar from all the joints of the other chimney-shafts of the house and premises, to repair thoroughly the brick-work of the said chimney-shafts, providing for the work sufficient new hard stock-bricks and the other requisite materials; and to point all the external brick-work of the old chimney-shafts with the best stone-lime blue coal-ash mortar.

Chimney-pots, &c. To re-set such of the present chimney-pots as will be found undecayed and sound, and to provide and set new chimney-pots sufficient to make up all deficiency in the present chimney-pots: the whole of the chimney-pots are to be flanched round with new plain tiles, and all the chimney-pots and tile-flanchings are to be set in one-half new quick cement and one half clean Thames sand.

Parapets. To take the parapets and walling of the back

and of the house down to the bottoms of the arches of the two-pair-story, and to rebuild the said brick-work in a neat and workmanlike manner, using only such of the present bricks as will remain perfectly sound, and providing all new bricks requisite for making up all deficiency.

Arches (if any). To clean carefully the sound bricks of the gauged arches which will be taken out in the performance of the intended works; to provide new cut or gauged bricks to make up the deficiency which will be found in the arch-bricks after setting aside the broken and defective arch-bricks, and to re-set and make good with the new parts thereof the whole of the arches so intended to be taken out, and to tuck-point the same arches when re-set.

To re-set and make good all the other arches which will be disturbed by the performance of the intended works.

Party-walls, &c. To take off the tile-crestings, the brick-on-edge, and the other defective parts of the brick-work of the tops of the party-walls, and of the other walls and brick-work in and about the roofs; to re-place, repair, and make good, all the said brick-work, putting thereto new sound double plain-tile cresting and new brick-on-edge of new sound hard grey stock-bricks: the whole of the brick-on-edge and tile crestings are to be laid in, and to be jointed with one half new quick cement and one-half clean Thames sand; and all the other brick-work is to be set in good stone-lime-mortar. (See pp. 92, 109).

Brick-work within the roof (if any). To repair with the requisite new sound grey stock-bricks all the defective brick-work between the roofing and the upper ceilings; and to rake out the mortar from the joints thereof and point with stone-lime mortar the whole of the said brick-work within the roofing.

Repairs to tiling (if any). To examine carefully and repair thoroughly the whole of the tiling of ; to take out therefrom all the decayed and unsound tiles; to provide new sound tiles sufficient for making up all deficiency in the present tiles; to re-set all the hip-tiles and ridge-tiles in stone-lime mortar with sufficient hair therein, each tile thereof being secured by a strong T

nail dipped in melted pitch, and each hip having a proper hip-hook, also dipped in melted pitch, and the plain tiles are to be pegged in the best manner possible; and all the requisite new double laths of heart of fir are to be provided by the contractor.

Tiling wholly stripped (if any).

To take off the whole of the tiling from .

Bricks, mortar, &c.

To provide all requisite new facing-bricks to match the present facing-bricks, and all requisite new hard well-burnt grey stock-bricks of the best quality; all the bricklayer's work, except where herein otherwise directed, is to be done with the very best mortar, composed of one-third Dorking stone-lime and two-thirds sharp Thames sand.

Colouring, &c.

All the brick-work which is intended to be re-built or to be repaired is to be coloured to match the adjoining brick-work, and is to be wholly pointed with very dark coloured mortar, so that the new work and the reparations may not afterwards when dry show any stain or difference of colour.

Rubbish.

(See p. 76).

Jobbing-work.

(See p. 79).

MASON.

Take off copings.

To take off carefully from the present stone-copings.

Re-work, re-set, and make good old copings.

To re-square and re-work and throat, where necessary, and re-set the sound and perfect parts of the present stone-copings; and to provide new stone-coping similar to the present copings to make up all deficiency in the copings of .

New Portland stone copings (if any.)

To cover the parapet of and with new Portland stone-coping 13 inches wide, 4 inches thick in front, $2\frac{1}{2}$ inches thick at the back, throated at both edges thereof, and with solid quoin stones.

New Yorkshire stone copings (if any).

To cover the parapets of and with copings of new 3 inch Yorkshire stone 13 inches wide, throated at both edges, and laid sloping.

Joints, &c.

All the stone-copings are to be set in cement,

and are to have all the joints thereof channeled and plugged and run with lead.

SLATER.

Stripping. To strip off carefully from the roofs all the present slating.

Slating partly old. To re-square such of the present slates as will be found after careful examination to remain sound and undecayed, and to cover therewith the roof over as far as the same will go thereto, and to provide the best new sound slates, of the same kind as the other slates of the roof, sufficient for completing therewith in an uniform manner the same roof.

Slating wholly new. To slate the roofs over with the best new strong countess (or duchess or other slates, as the case may be).

Bond, nails, &c. (See p. 82).

Pointing (If the slating be laid upon battens it should be pointed on the inside, for which see p.).

Reparation of accidents. (See p. 82).

CARPENTER.

Timbers of roofing. To examine carefully the whole of the timbers and wood-work of all the roofing; to take out and remove therefrom all the decayed and unsound timbers and wood-work, and to replace the same by new yellow Baltic fir, and new yellow deal of scantling thickness and dimensions to correspond (*unless any improvements are intended*) with the former timbers and wood-work.

(The specification may contain a particular description of such rafters or other timbers as are intended to be new, or it may state what cubic quantity of new timber is to be used in the work).

Sundries. (See p. 82).

Furring. To fur up with yellow deal all the sunken rafters

and other timbers in all cases where the same have sunk.

Gutters.

To take up all the (defective) (*this word may be omitted if the whole of the gutters require to be taken up either from decay or insufficiency of drips and currents*) gutter-boards and bearers, and to put (sufficient) new inch yellow deal gutter-boards and new strong yellow deal bearers laid to a current of full $1\frac{1}{2}$ inch to every 10 feet, and with $2\frac{1}{2}$ inch rebated drips, so disposed as that no sheet of lead shall be more than 16 feet long. To put at the sides of the gutters new $\frac{3}{4}$ inch yellow deal lear-boards 10 inches wide.

Slate-battens, &c. (if any).

To put to the roofs new slate-battens of $\frac{3}{4}$ inch yellow deal $2\frac{1}{4}$ inches wide; and to repair and make good with new $\frac{3}{4}$ inch yellow deal the present slate-boarding (*if any*).

Dormers.

To repair thoroughly and re-hang with new strong hinges and fastenings the outer door and the inner door of the dormer.

To put to the other dormer a new inch yellow deal ploughed, cross-tongued, beaded, and ledged outer-door, hung with a pair of very strong cross-garnet hinges and a strong bolt.

Extra timber-work (if any).

(See p. 89)

Quality of timber and deal.

All the new timber and deal are to be thoroughly seasoned and free from sap-wood and from shakes and other defects. (See p. 82).

Ridges and hips.

Cover the ridges with a plain ridge-tile set in hair mortar, and the hips with slate hipping properly screwed together, and to the battens.

Jobbing-work.

(See p. 103).

PLUMBER.

Take off old lead-work.

To take off from the roof and gutters all the present lead-work, except (*if any exception*).

New 6lb. cast-lead gutters.

To lay to the whole of the gutters new cast-lead, weight 7lbs. to the foot superficial, turned up full 5 inches high next the brick-work parapets and other

upright boundaries of the guttering, and full 9 inches high upon the lear-boards (*or state more or less, as the case may require, according to the pitch of the roof*).

New 7lb. cast-lead to flats (if any).

To lay the flats with new 6lb. lead turned up full 5 inches high all round the edges thereof, properly rolled at all the lateral joints (*the rolls should not be more than* 2 *feet* 3 *inches apart*) and properly lapped with $2\frac{1}{2}$ inch drips at the heading-joints of the sheets of lead.

New 5lb. lead to valleys (if any).

To lay the valleys with 5lb. cast-lead 20 inches wide.

New 6lb. milled-lead to dormer.

To cover the top sides and door-case of the dormer with 6lb. milled-lead, to be dressed down all round next the roof full 8 inches; and to put over the sill of the dormer-door an apron of 6lb. milled-lead 18 inches wide.

To put to the (*slated*) dormer a ridge of 4lb. milled-lead 16 inches wide, flashings all round next the roof of 6lb. milled-lead 14 inches wide, and at the foot of the door an apron of 6lb. milled-lead 18 inches wide.

New 4lb. milled-lead flashings

To put all round the gutters and flats flashings of 4lb. milled-lead 5 inches wide.

Step-flashings of 5lb. milled-lead (if any).

To put in the brick-work to the ends of all the slating which rake against the same, step-flashings of 5lb. milled-lead average 13 inches wide.

Curb flashings of 5lb. milled-lead (if any).

To put at the junction of the curb-rafters with the upper-roofing a flashing of 5lb. milled-lead 12 inches wide.

5lb. milled-lead flashings to sky-lights (if any).

To put all round the sky-lights flashings of 5lb. milled-lead 12 inches wide.

Repair old lead-work (if any).

To solder, dress, and repair thoroughly the gutters, flats, and other lead-work (*if any*) of

R. W. pipes.

Remove the lead rain-water-pipes, and re-fix new stacks of cast-iron 4 inch diameter, with approved plain heads, proper bands, and wall-nails, and junction with drains.

New copper eaves'-guttering (if any).

To put to new 5 inch eaves'-guttering of sheet copper, weight 16 ounces to the foot superficial, and securely fixed on sufficient strong wrought-iron brackets.

New cast-iron eaves'-guttering (if any).

To put to new 4 inch cast-iron eaves'-guttering, put together with white-lead, and securely fixed upon sufficient strong wrought-iron brackets.

PAINTER.

To paint four times with the best oil-colour the outside and inside of the dormer-door, and all the weather-boarding and other external wood-work (*if any*) in and about the roofing.

To scrape and clean perfectly free from rust, and paint five times with the best oil-colour, all the pipes and gutters, and all the other iron-work in and about the roofing, the first two coats of colour to the iron-work being done with red-lead paint.

CHAPTER XI.

SPECIFICATION FOR ERECTING *and completely finishing a* LABOURER'S COTTAGE, *on a plot of ground situate at , for , according to the drawings, and under the superintendence of Mr. , of , architect.*

EXCAVATOR, BRICKLAYER, AND TILER

Excavation, &c.

To excavate the ground for the foundations, cess-pools, and other works which will so require; to fill in and consolidate around the footings and lower parts of the brick-work when executed as much earth as may be necessary; and to dispose of, in making up and raising the site of the cottage, all the remainder of the earth which will be excavated, and of all the rubbish which will result from the performance of all the several works.

New brick-work (see p. 76).

To execute according to the drawings all brick-work which will be requisite for carrying into effect and for completing the cottage with the appurtenances thereof.

Chimneys.

To properly turn, parget, and core all the flues; to put to each of the fire-places a chimney-bar of wrought-iron 2 inches by $2\frac{1}{2}$ inches; to put to each of the fire-places of the one-pair-story a 4 inch brick trimmer; and to put under the slab to the fire-place of the parlour upon the ground-story a fender of 4 inch brick-work 15 inches high.

To carry up the chimney-shafts according to the drawings, with the oversailing courses and strings shown on the elevations set in cement.

Piers.

To build for the support of the sleepers of the parlour brick piers not more than 3 feet 6 inches apart, and each composed of three courses of work 9 inches by 4 inches, and one course of work 9 inches by $13\frac{1}{2}$ inches; and to build under the water-butt two piers 2 feet high 9 inches by 18 inches, and with two courses of footings $13\frac{1}{2}$ inches by $22\frac{1}{2}$ inches.

Bedding, &c. (See p. 241).

Cess-pool, &c. To stein round the cess-pool with 4 inch dry brick-work, and to put from near the water-butt and from the sink to the cess-pool a 4 inch socket-jointed drain-pipe. (See also p. 78).

Paving. To consolidate properly the ground, and to pave the kitchen and the porch with 12 inch red tiles set in stone-lime mortar upon full 6 inches in depth of concrete or coal-ashes and lime-rubbish, or lime-core; the tiles in the porch are to be set diagonally, with a square border of tiles round the other tiles.

Cuttings (if any). To cut and rub splays in the most careful and accurate manner to the brick-work round all the doors and windows, to the heads of the chimney-shafts, and to the other parts of the building, as may be requisite in order to complete the same according to the drawings; and provide moulded bricks, where indicated on the drawings, *i. e.*, to plinth, eave cornice, window-heads, and door-heads.

Arches. To put to the whole of the external openings gauged arches according to the drawings, accurately cut and set quite close at the soffit and at the back.

Facings (if any). To face the fronts with good stocks of uniform colour (the colour and description of brick will be that made in the locality, if suitable).

Bands and strings (if any). Where the design represents bands and strings of different coloured bricks to those of the rest of the facing, they should be here particularly described.

Tiling. Cover the roofs with red plain tiles, laid to proper bond, hung with oak pegs upon double fir tile laths, and set in hair mortar. Set on the ridges a ridge tile of simple pattern, laid in hair mortar; and cover the hips with hip tiles, made to the angles of the roof, and ranging in with the roofing tiles.

Filletting. (See p. 82).

Bricks. All the bricks, except where herein otherwise directed, are to be the best new square hard well-burnt grey stock-bricks (or red kiln-burnt or other

bricks, as the case may be,) without admixture of soft bricks, or broken, or other imperfect bricks.

Mortar. (See p. 78).

Mode of doing the work. (See p. 78).

Jobbing work. (See p. 79).

MASON.

Window-sills. To put to each of the windows a sill of Yorkshire (or other stone, as the case may be,) 9 inches wide and 3 inches thick, wrought with fair edges and ends, throated, and laid sloping.

Chimneys. To put to the kitchen fire-place jambs, mantle, and shelf, each of 2 inch Portland stone 7 inches wide.

To put to each of the other fire-places, jambs mantle, and shelf, of $1\frac{1}{4}$ inch Portland stone 5 inches wide, and a back hearth and a chimney-slab or front hearth, of 2 inch rubbed Yorkshire stone.

Sink. To put in the kitchen a sink of 7 inch Yorkshire stone 2 ft. 9 inches long and 2 feet wide, securely fixed with the requisite bearers, and cut out to receive the waste-pipe and grate. (See also p. 81).

Steps To put to each of the external doorways a step of solid (Yorkshire) stone 13 inches by 7 inches, properly back-jointed and fixed upon four courses of 9 inches brick-work.

CARPENTER AND JOINER.

New materials. (See p. 82).

Timber and deal. (See p. 82).

Sundries. (See p. 82).

Bond-timber, &c. To put wood-bricks sufficient for fixing the finishings and other works in need thereof.

Lintels. (See p. 83).

One-pair-flooring.

	Ins.	Ins.
Wall-plate	4 by	$2\frac{1}{2}$
Joists	6	$2\frac{1}{4}$
Trimmers and trimming-joists	6	$2\frac{3}{4}$

Boarded-flooring of inch white (or yellow, as the case may be,) deal.

Ground-flooring.

Sleepers of English oak	$4\frac{1}{2}$	3
Joists	4	2

Boarded-flooring of $1\frac{1}{4}$ inch yellow deal listed free from sap-wood.

Roof.

To construct the roof according to the drawings with

Wall-plates	4	3
4 Tie-beams	8	3
Angle-ties, each 4 feet long	4	$2\frac{1}{2}$
Dragon-pieces	4	2
Rafters	4	2
Ridge and hips	8	1

Fascia and eaves'-soffit (if any) of $\frac{3}{4}$ inch yellow deal tongued.

Quartered partitions.

(If any, see p. 85).

Doors, &c.

To fit up the external front or principal entrance-door-way with a fir proper door-case 5 inches by 4 inches, and a four-panel stop-chamfered square framed door, hung with 4 inch butt-hinges two 10 inch rod-bolts and a 10 inch iron rimmed draw-back lock with strong brass furniture.

To fit up the back door-way of the house, and the door of the privy, with fir proper door-cases 4 inches by 4 inches, and $\frac{3}{4}$ inch deal, wrought, beaded, grooved, cross-tongued, and ledged doors, hung with 18 inch cross-garnet hinges and Norfolk thumb latches; and to put to the back-door two 10 inch rod-bolts, and to the privy door a small bolt.

To put to the closet deal stops and $1\frac{1}{4}$ inch four-panel square framed doors, hung each with a pair of 3 inch butt-hinges and a strong 4 inch closet-lock with brass escutcheon.

To fit up all the remainder of the door-ways with $1\frac{1}{2}$ inch four-panel square framed doors, hung each with a pair of $3\frac{1}{2}$ inch butt-hinges and a good 7 inch

iron rimmed lock with key and plain strong brass furniture.

Door-linings. To put to the doors the requisite linings of $1\frac{1}{4}$ inch yellow deal single-rebated.

To fit up all the remainder of the windows with $1\frac{1}{4}$ inch chamfered-bar casements, part fixed and part hung with hinges and fastenings in solid fir chamfered frames 4 inches by 4 inches, with framed and chamfered mullions 4 inches by 3 inches, oak sunk sills 4 inches by 3 inches, and wrought-iron saddle-bars $\frac{1}{2}$ inch square, and casements of wrought-iron with frames 1 inch by $\frac{1}{2}$ inch saddle-bars, hinges, and proper fastenings complete.

Window-linings. To put round all the windows, inch yellow deal tongued and beaded linings.

Skirtings. To put to all the wood partitions skirtings of $\frac{3}{4}$ inch yellow deal 8 inches high.

Closet-fittings. To put in each closet a shelf of inch deal as large as the closet will admit.

Angle-staves. To put to the projecting angles of all the chimney-breasts proper rebated angle-beads.

Dresser. To put in the kitchen a dresser, with $1\frac{1}{4}$ inch clean deal top cross-tongued, $\frac{3}{4}$ inch deal pot-board, framed legs and bearers, two drawers of $\frac{3}{4}$ inch deal rims and bottoms and inch deal fronts, two standards of inch deal, and three framed and sunk shelves of inch deal 8 inches average width.

Staircase. (See p. 227).

Water-closet. (See p. 88).

Jobbing-work. (See p. 103).

PLASTERER.

L. P. F. To lath, plaster, float, and set ceilings and strings to the whole of the building, and to the privy; and to lath, plaster, float, and set all the quartered-partitions (*if any*).

R. S. To render and set the whole of the internal brick-work of the cottage, except that of the offices.

Whiting. To whiten all the ceilings and the strings of the stairs.

To lime-whiten twice the internal brick-work of the out-house or scullery.

Colouring. To tint of stone-colour in distemper the whole of the plastering of the sides of the cottage.

Lime-white. To lime-white twice the inside walls of privy and other offices.

Cement Skirtings. To put all round the brick-work of the whole of the rooms, closets, and other plastered parts of the cottage, skirtings of Portland cement 8 inches high and one inch thick.

PLUMBER.

Chimney-gutters. To lay the chimney-gutters with 6 lb. milled-lead 18 inches wide, and to put thereto flashings of 4lb. milled-lead 5 inches wide.

Eaves'-guttering. To put to all the eaves 4 inch cast-iron trough-guttering, put together with white-lead, and securely fixed upon sufficient strong wrought-iron brackets.

R. W. P. To provide and fix from the eaves'-guttering to the water-butt a complete stack of 3 inch cast-iron rain-water-pipe with proper head and shoe.

Water-butt. To provide and fix in the garden against the cottage a strong, sound, and good wine-pipe to serve as a water-butt, and to put thereto $\frac{3}{4}$ inch lead pipe leading from the water-butt to the sink, and to put to the water-butt two good brass cocks, one to draw water at the sink, and the other to draw water in the garden.

Grates. To provide and set in the kitchen a range value £4.

To provide and set grates to the other rooms, average price 15*s*.

Sink. To put to the sink a strong 2 inch lead waste-pipe with a brass bell trapped grating.

GLAZIER.

To glaze all the windows and lights with good second Newcastle glass in squares, average 6 inches by 8 inches, properly bedded and bradded.

To clean and leave perfect all the glazing at the rendering up of the works as complete.

PAINTER. (See p. 222).

CHAPTER. XII.

SPECIFICATION FOR ERECTING *and completely finishing* A COTTAGE, *with out-buildings thereto, at , for , according to the Drawings, and under the superintendence of Mr. of , architect.*

BRICKLAYER.

Take down old buildings, Stack up materials.

Clear away rubbish, &c.

To take down the present house and the out-buildings thereof; to clean all the sound bricks therein; to sort, set apart, and stack up for use, all the materials fit to be again used; and to remove to such part of the premises as may be by the architect directed all the rubbish and useless materials rejected from the old buildings, and all the rubbish which may arise from the execution of all the several works of the intended new buildings.

Digging.

To dig out the ground for the foundations, drains, and other works of the intended new buildings, and to fill in again and dispose of the ground to the levels shown by the drawings.

Concrete.

(See p. 75).

General brick-work.

To execute all brick-work requisite for carrying into effect the buildings according to the drawings, and to complete the buildings in every respect.

Chimneys.

To properly turn, parget, and core all the flues; to put to the parlour fire-place a 4 inch brick fender 12 inches high, in order to support the chimney-slab; to put to each of the chamber fire-places a 4 inch brick trimmer 12 inches longer than the chimney-opening; to carry up the chimney-shafts according to the drawing, with the flues detached from each other, and with the upper four courses thereof set in cement; and to lay to each fire-place on the one-pair-story a foot-pace of paving-tiles.

Gauged arches.

To put to the arches, to doors and windows, and

other openings of the house, gauged arches 8 inches on the face, chamfered at the edges, and properly set.

Splays, &c. To provide and set moulded bricks to the lower plinth, round the windows and doors, and to the slopes of the chimney-stacks, and to finish the same as shown by the drawings; and to cut and rub where required.

Bedding. (See p. 78).

Piers, &c., under ground-floor. To put brick piers 3 courses high and 9 inches by 4 inches, not more than 3 feet apart, to support the sleepers of the ground-story, and to put 12 feet run of 4 inch brick-work 18 inches high next the wood-flooring to complete the closet, &c., under the stairs.

Bricks. In the performance of the brick-work, the contractor is to be allowed to use, when properly cleaned, such of the present old bricks as remain sound, but he is to find sufficient new sound hard-burnt square stock-bricks of a good bright colour for facing all the external work of the principal building, and for making up all deficiency which may be found after laying aside the useless old bricks.

Mortar. The whole of the mortar to be used in the work is to be compounded in the proportion of one-third by measure of the best stone-lime and two-thirds by measure of clean sharp *(Thames)* sand properly worked and beaten up together.

Mode of doing the work. (See p. 76).

Cess-pool. To dig out for the privy, and stein round with 4 inch dry brick-work, a cess-pool 2 feet 6 inches diameter, and 8 feet deep, internal dimensions. (See also p. 78).

Paving. To pave the kitchen, the closet under the stairs, the part between the same closet and the kitchen, and also the wash-house and the back-porch, with the present sound old paving-bricks of the present building, and such new bricks similar thereto as will be required for making up the deficiency.

Lime-whiting and colouring. To lime-whiten twice the internal brick-work of the privy and of the wash-house.

Tiling. To cover the principal roof of the dwelling-house

with the best well-burnt plain-tiles on strong heart of fir double laths; and to cover the lean-to roof of the wash-house, and the roofs of the stable and cart-shed, with pan-tiles. Note that such of the tiles of the present building as may turn out sound and undecayed may be used in the new building, but all deficiency therein is to be made up with new sound tiles, the whole of the ridge-tiles and hip-tiles are to be secured by T nails, and the hips are also to have proper wrought-iron hip-hoops. The T nails and hip-hoops are to be dipped in melted pitch.

MASON.

Sills. Mullions, heads, sills, and transoms of windows and doorways, string courses, and other work tinted yellow on the elevations, to be of box ground Bath stone, of good quality, free from vents, shakes, and other defects, and set in its natural or quarry bed.

Front doorway, step, and water-tabling. To put to the front doorway of the house a step of solid Yorkshire stone 12 inches by 7 inches, rounded at the ends thereof; and to finish the small gable of the entrance with Portland stone water-tabling and finial according to the drawings.

Sink. To put in the wash-house a sink 2 feet by 2 feet 9 inches of Yorkshire stone 7 inches thick, cut out for the grate and waste-pipe, and fixed complete. (See also p. 81).

Chimney-pieces. To put to the kitchen fire-place jambs and mantle of 1½ inch Portland stone 7 inches wide; to put to the fire-places of the parlour and chambers 1 inch Portland stone jambs, mantles, and shelves, 5 inches wide.

Slab. To put to the parlour fire-place a slab of 1½ inch Portland stone 18 inches wide.

6 bases for posts. To provide and fix six Yorkshire stone bases for the heel-posts of the stable and the story-posts of the cart-shed, each to contain one foot cube, and properly tooled and mortised.

CARPENTER AND JOINER.

Materials, &c. (See p. 82).

Timber and deals. (See p. 83).

Wood-bricks. (See p. 97).

Centering and sundries. To provide all centering requisite for turning the arches and trimmers; and to provide all requisite fillets, beads, stops, blocks, and linings; and to perform such rebating, beading, grooving, tonguing, and other labour, as may be necessary to the work and the complete finishing thereof.

Roofs, &c.

	Ins.	Ins.
Wall-plates	4 by	$2\frac{1}{2}$
Rafters to the stable-building and to the cart-shed	$3\frac{1}{2}$	2
All the other rafters	$4\frac{1}{2}$	2
Purlins to the stable-building and cart-shed	6	4
Two struts to ditto	3	3
4 angle-ties, each 8 feet long to ditto ...	4	2
Ridges and 4 short hips	$8\frac{1}{2}$	$1\frac{1}{4}$

1 inch deal chimney-gutters on proper bearers.

Ceiling-joists 7 feet long saddled to each pair of rafters of the dwelling-house	3	$1\frac{1}{4}$
2 wrought and framed breast-summers to the roof of the cart-shed	8	6
4 wrought and framed posts to ditto ...	8	4

A pair of $\frac{3}{4}$ inch deal proper ledged gates, the whole height of the cart-shed hung with ironmongery, value £2.

Ground-floor.

Old (*or new, as the case may be,*) oak joists	$3\frac{1}{2}$ by 2
Old (*or new, as the case may be,*) oak sleepers	3 3

Inch yellow deal floor laid free from sap-wood.

Other floors.

Wall-plates	4 by	$2\frac{1}{2}$
Joists to the principal building ...	6	2
Ditto to the stable-loft	4	2

Trimmers each one inch thicker.

2 binders to the stable-loft	9	4
2 heel-posts under ditto, framed, wrought, and chamfered	4	4

The flooring to be laid with new inch white deal.

Staircase. (See p. 227). To fit up beneath the staircase a closet with inch deal and half-inch deal board and braced spandril-partition, with one of the present old doors repaired and re-hung therein with proper stops and a button.

1½ inch square-framed partitions and doors.

To inclose the rooms by 1½ inch square framed partitions and doors according to the drawings; each door is to be hung with a pair of 3 inch butt-hinges and a 6 inch good iron rimmed lock, and is to have beaded door-stops round the same.

Other doors.

To put to the front entrance an inch proper ledged door, hung with ironmongery value 15*s.* in a wrought and chamfered door-case 6 inches by 4 inches. To put to the back porch and to all the other doorways new ¾ inch proper ledged doors, the whole thereof hung with the requisite new hinges; the large stable-door, the loft-door, and one of the wash-house doors are to have 9 inch rough rod-bolts; the other doors, of the stable and wash-house are to have 7 inch stock-locks; the privy-door is to have a small bolt, and the back entrance-door is to have two 9 inch rod bolts.

Door-cases and linings.

To put fir proper door-cases 4 inches by 4 inches and 1¼ inch rebated door linings where requisite, and as shown by the plans.

Closet.

To fit up a closet in the kitchen with 1¼ inch square framed front and door, the door hung with 3 inch butt-hinges and a strong lock, and the closet fitted up on the inside thereof with three tiers of inch deal shelves the depth of the closet.

Skirting.

To skirt the parlour, the entrance-passage, the two chambers, and the closet adjoining thereto, with ¾ inch deal 4¼ inches high plugged to the walls.

Shutters.

To fit up the windows of the parlour with inch clamped shutters hung with strong hinges and fastenings; and to put to the kitchen one of the present old shutters prepared, altered, adapted, and made complete.

Dresser.

To put in the kitchen a dresser with shelves and fittings complete, value £3.

Privy.

To fit up the privy with inch deal seat and riser and all requisite bearers.

Stable:

To fit up the stable with 3 inch deal chamfered moveable stall-rails 4 inches wide, 3 wrought-iron hay-racks, inch deal mangers with grooved and cham-

fered oak top-rails $3\frac{1}{2}$ inches by $2\frac{1}{2}$ inches and fixed on strong bearers; and to provide a step-ladder to lead through a well-hole into the loft.

PLASTERER.

Lath, plaster, set, and whiten. To lath, plaster, set, and whiten ceilings and strings to the whole of each story of the dwelling-house, the wash-house excepted.

Render and set. To render and set the whole of the internal brick-work of the dwelling-house, that to the wash-house parlour and privy excepted.

Cement skirting. To put round the walls of the kitchen a skirting of cement nine inches high.

SMITH AND PLUMBER.

Iron-work. To put to each of the fire-places on the ground-story a chimney-bar of wrought-iron 2 inches by $\frac{3}{8}$ inch; to provide and fix where directed 224lbs. of wrought-iron in straps, ties, and bolts.

Provide to one light of each window an opening casement the full height and width of the light, a cast-iron casement with proper hinges, turn buckle, and stay-bars.

To lay the chimney-gutters with 5lb. milled-lead 12 inches wide; to put to the sink a grate and a 2 inch waste-pipe bent to form a trap; to remove, repair, re-fix in the wash-house, and make complete the present pump.

GLAZIER.

To glaze all the windows and lights with good third crown glass; and to clean and leave perfect the whole of the glass at or immediately before the whole of the works are rendered up as complete.

PAINTER.

To knot, stop, prepare properly, and paint four times in the best oil-colour all the wood-works and other works of the premises usually painted, and to finish the same of such plain colours as the architect may direct.

CHAPTER XIII.

SPECIFICATION FOR ERECTING *and completely finishing fit for occupation at , in the county of , a* SMALL LODGE *or* COTTAGE *for , agreeably to the drawings and according to the directions of Mr. , of , architect.*

EXCAVATOR, BRICKLAYER, AND WALLER.

Ground-work. To level the ground over the whole site of the intended building; to excavate the ground for all the footings and work so requiring; to fill in again, ram down, and consolidate the ground about the new work; and to dispose of and make up the ground with the spare earth and rubbish which will result from the execution of the intended works around the building, as shall be by the architect directed.

Concrete. (See p. 75).

The outside walls to be built of the walling stone from the quarry at , faced in random walling, the beds and joints not being dressed, but the face roughly hammered and the joints finished with a neat flat point.

The quoins to be of similar stone to the rest of the walling, but to be dressed upon the beds and aned, to be laid in an artistically irregular form, and to vary from 7 inches to 16 inches on the beds.

General walling. To execute all the walling which will be requisite for forming and completing the foundations, walls, chimneys, and other parts of the lodge and its appurtenances in every respect as shown on the drawings.

Rough arches. To turn in brick-work in mortar rough arches and counter-arches through the entire thickness of the respective walls, except to within 4 inches of the outside face, the centering being left up till the same is by the architect directed to be in the first instance eased and afterwards to be finally struck.

Brick-work. The internal walls, the chimney-breasts, and the flues, to be carried up in brick-work.

Chimneys. To properly turn, parget, and core all the chimney-flues; to carry up the chimney-shafts according to the drawings; to put to each fire-place on the ground-story a brick fender 9 inches thick and 2 feet high, in order to receive the chimney-slab; and to put to each of the other fire-places a 4 inch brick trimmer at least 18 inches longer than the chimney-opening.

Bedding, &c. (See p. 241).

Chimney-bars. To put to each fire-place with projecting breasts a wrought-iron chimney-bar 2 inchs by $\frac{5}{8}$ inch.

Piers under boarded floors. To build under the boarded-floors on ground-story brick piers each 9 inches square and 9 inches high, with a footing in addition thereto 14 inches square and one course in height, and 3 feet 6 inches apart.

Drains. (See p. 77).

Tile pavement. To pave the floor of porch with 6 inch square red tiles laid in mortar on a bed of 4 inch of concrete; pave the scullery with tiles 12 inch square.

Mortar. (See p. 78).

Damp-course. Set at the level of ground the full thickness of wall a damp-course composed of a mixture of gas-tar and sand, care being taken not to allow the mixture to run over the face of the wall. (See also p. 240).

Mode of doing the work. (See p. 76).

Jobbing-work. (See p. 79).

MASON.

Stone-dressings. Provide and fix for the jambs, heads, sills, mullions, transoms, strings, plinths, copings, chimney-slopes, and other work coloured yellow on the elevations, the best stone free from vents, shakes, and other defects, and set on its natural or quarry bed.

Copings. Set each stone of copings with hard stone in cement, and put bond and apex stones worked out of the solid.

Steps. Provide solid rubbed York steps 18 inches longer than the openings to the external doorways 6 inches rise.

Sink. To put in the scullery a sink of Yorkshire stone 7 inches thick, containing 10 feet superficial, set upon the requisite brick-work, and cut out to receive the waste-pipe and grate. (See also p. 81).

Chimney-pieces. To put to the best rooms chimney-pieces and fixing complete, value £2 10*s*. each.

To put to the kitchen fire-place 2 inch Portland stone jambs, mantle, and shelf, each 7 inches wide, and a rubbed Yorkshire stone hearth containing 20 feet superficial.

To put to all the remainder of the fire-places inch Portland stone jambs, mantles, and shelves, each 5 inches wide, $1\frac{1}{2}$ inch Portland stone chimney-slabs 1 feet 6 inches wide and 12 inches longer than the chimney-opening, and 2 inch rubbed Yorkshire stone hearths to all fire-places.

TILER.

Tiling. (See p. 211).

Ridge and hip tiles. (See p. 211).

Reparation. (See p. 94).

CARPENTER AND JOINER.

Materials, &c. (See p. 82).

Timber and deals. (See p. 82).

Iron-work. To provide and fix 1 cwt. of wrought-iron in such stirrups, screw-bolts, ties, and other work as may be directed.

Sundries. (See p. 82).

Wood-bricks. To put in the brick-work such wood-bricks as may be requisite for fixing the various finishings.

Centering. (See p. 97).

Lintels. To put the requisite fir lintels over the various openings, each lintel being in scantling 4 inches by the breadth of the wall, and 15 inches longer than the opening.

Kitchen-floors. To lay to the boarded floors on ground-story a floor of $1\frac{1}{4}$ inch yellow deal listed free from sap-wood, with fir joists $4\frac{1}{2}$ inches by $2\frac{1}{2}$ inches upon oak sleepers 4 inches by 3 inches.

One-pair floors.

	Ins.	Ins.
Wall-plates	4 by	4
Joists	9	$2\frac{1}{2}$
Trimmers and trimming-joists	9	3

One tier of herring-bone struts to each floor.
Inch yellow deal floors of half-boards listed, free from sap-wood.

Roof.

Wall-plates	6 by	4
Principal rafters, at top 6 inches by 5 inches, at bottom	8	5
Tie-beams	9	5
Braces	5	$2\frac{1}{2}$
Purlins	6	4
Ridges	$1\frac{1}{4}$	$8\frac{1}{2}$
Common rafters and collars	$3\frac{1}{2}$	2
Valley-pieces	6	3

Quartered partitions.

Heads and sills	4 by	$3\frac{1}{2}$
End-posts, door-posts, and door-heads ...	4	3
Braces (or struts)	3	3
Quarters	4	$2\frac{1}{4}$
Two tiers of inter-ties to each story ...	3	$1\frac{1}{4}$

Skirting. To skirt the best rooms with inch plinth $10\frac{1}{2}$ inches high, and mouldings $4\frac{1}{2}$ inches girth, fixed upon ploughed grounds and with proper backings.

To skirt the remainder of the building except the scullery, with inch deal 7 inches high, plugged.

The bay-window is to be roofed over with wall-plates 3 inches by 3 inches, rafters 3 inches by 2 inches, and inch yellow deal boarding.

To fit up all the windows with inch deal, tongued, and beaded linings.

External doors. To fit up the external doorways with fir proper door-cases 5 inches by 4 inches and 2 inch doors framed bead-flush on both sides; each door is to be hung with two 4 inch butt-hinges, and is to have inch tongued and beaded door-linings and lock and bolts of the value of 10s. to each door.

Internal doors. To put to the best rooms 2 inch four-panel doors stop chamfered on both sides, and hung with 4 inch butt-hinges and best mortise-locks with brass furniture; and to put to all the remainder of the doorways and closets $1\frac{1}{2}$ inch four-panel square framed doors, hung with 3 inch butt-hinges, and the best 7 inch iron rimmed locks with brass furniture.

Door-linings, &c., &c. To put to all the internal doorways $1\frac{1}{4}$ inch single rebated linings, and inch deal framed and chamfered grounds 4 inches wide, chamfered and stopped.

Staircase: To construct the staircase according to the drawings, with $1\frac{1}{4}$ inch clean deal steps, landings, and risers, securely fixed upon strong bracketed fir carriages, $1\frac{1}{2}$ inch deal wall-strings and beaded outer string-boards.

To fit up the staircase with all requisite inch deal apron and other linings and bearers, oak newells, 3 inch square, chamfered, stopped, and plain-cut tops, turned oak balusters, and moulded hand-rail.

Dresser. To put in the kitchen a dresser with shelves, drawers, and fittings, complete value fixed £6.

Closets. To fit up each of the closets all round with three tiers of inch shelves 10 inches wide, fixed upon bearers complete.

PLASTERER.

Floated ceilings. To lath, plaster, float, set, and whiten ceilings and strings to the whole of the lodge.

R. F. S. To render, float, and set the whole of the walls.

Colouring. To colour the sides of the scullery of a tint of stone colour.

Cornices. To run round the best rooms on the ground-story cornices 15 inches girth.

Arches, arrises, &c. To execute in troweled stucco the jambs and arches leading to the bay-windows; and to execute to the plastering all requisite arrises, beads, and quirks.

Cement skirting. To put all round every part of the scullery skirting of cement, one inch thick and 9 inches high, tinted stone colour.

SMITH AND PLUMBER.

4lb milled-lead ridges. To cover the ridges with 4lb. milled-lead 16 inches wide, properly secured.

6lb. milled-lead valleys, chimney-gutters, 4lb. milled-lead flashings. To lay the valleys and the chimney-gutters with 6lb. milled-lead turned up at least 6 inches at the sides thereof, and with 4lb. milled-lead flashings 5 inches wide let into the brick-work.

Grates. To provide and set in the kitchen a range, value £4 0 0

To provide and set in the other rooms a grate, value each 1 0 0

Waste-pipe, &c. To put to the sink in the scullery a 2 inch strong lead waste-pipe to lead into the drain, and a large brass bell grate.

R. W. P. and gutters. To put to the eaves of the lodge 3 inch cast-iron troughs jointed with white-lead, fixed on strong wrought-iron brackets complete; and to put from the eaves'-troughs to the area two stacks of 3 inch cast-iron rain-water-pipe and one stack of $3\frac{1}{2}$ inch rain-water-pipe, fixed with swan necks and shoes complete.

Casements. Provide to each window one opening casement of wrought-iron, the full height and width of each light, with proper hinges, bolts, and stay-bars.

PAINTER.

4 times in oil To knot, stop, prepare properly, and paint four times with the best oil colour, all the wood-work, iron-work, and other works of the lodge, and of its appurtenances which usually are painted.

GLAZIER.

2nd glass. To glaze all the windows and lights with good second Newcastle crown glass, in small squares, average 5 inches, set in lead.

Cleaning, &c. The whole of the glass is to be properly bedded, bradded, and back-puttied, and is to be cleaned and left perfect at or immediately before the final rendering up of the lodge as complete.

CHAPTER XIV.

SPECIFICATION *for the erection of a* PARK *or* GARDEN WALL.
(*A drawing should be made showing the plan and extent of the walling, and with a section and elevation showing to a larger scale the structure and form of the work.*)

Digging and ground-work.

To excavate the ground for the foundation of the intended walling, and for all the piers and buttresses thereof, and as may be otherwise necessary for the performance of the intended work.

Alterations of levels.

(As on account of the undulating surface of the ground, it becomes necesssary to make many gradations both in the levels of the foundations and summit of a boundary-wall of considerable extent, care should be taken in the drawing to show the manner in which this is to be effected, and clear explanation should be given whether the depth of the foundation is intended to be taken as the medium depth, or whether from the highest or lowest point of the ground against each severy of the wall.)

Concrete.

(See p. 75).

To ram down the ground to the hardest possible consistence around the footings of the intended walling piers and buttresses; and when the foundations are laid, to fill in, beat down, and make up on both sides of the walling to levels corresponding with the nearest adjoining ground, as much of the ground to be dug out of the trenches as will be necessary for so filling up again and levelling the ground thereto.

To remove and cart away all the ground remaining superfluous after the trenches are filled; and to dispose thereof in filling up the

(It will be necessary, according to the nature and circumstances of the site, to consider whether it will be least expensive to cart away the superfluous earth, or to raise the surface of the ground

on each side of the wall, giving to the brick-work the requisite additional altitude).

If any portion of the ground be soft, it should be wholly dug out from under the intended brick-work, and either extra brick-work or concrete should be carried down below the ordinary bed of the work.

If the wall cross any rivulet or ditch, it must be well arched over; also if wall-trees, are to be planted against it, the foundation of the wall should be arched out between the buttresses of it, so as to leave free space for the roots of the trees.

Brick-work.

To construct of brick-work the whole of the intended inclosure walls to surround the , according to the drawing, the footings being spread out as shown on the sections.

(The footings will require to be spread more or less according to the goodness of the foundation; in a detached wall they can hardly spread too much, and on that account they may be spread at every course, although in general they are best laid double or spreading at only every 6 inches in height.)

Buttresses and piers.

To construct and bond in with the brick-work of the walling buttresses or piers not more than feet apart, feet inches wide, projecting on one (or on both, as the case may be,) sides of the wall $4\frac{1}{2}$ inches, and with all the footings of the foundation of the wall breaking in regular bond around each pier, the same as to the wall itself.

(The buttresses of boundary-walls should never break forward less than half a brick, nor should they break forward other than with projections of bricks or half bricks: if they project $\frac{1}{4}$ of a brick or $\frac{3}{4}$ of a brick, the bond with the rest of the work is sure to be broken, so that they become changed from buttresses to severances.)

Brick-on-edge and tile-cresting (if any).

To finish or cope the whole of the walling with brick-on-edge (and double plain tile-cresting, if any),

both set in and jointed with equal measures of Portland (or Roman) cement, and clean river sand.

Half-round coping.

Or To finish or cope the whole of the walling with half round coping bricks (or bricks moulded to any other form) set in and jointed with equal measures of Portland (or Roman) cement and river sand.

Saddle-backed coping-tiles.

Or To finish or cope the whole of the walling with saddle-backed coping-tiles joggled together and with throated projecting edges, set in and jointed with equal measures of Portland (or Roman) cement and river sand.

Ordinary park-wall coping (if any).

Or To finish the whole of the walling with one course of brick-work set angle-wise to project (or not to project, as the case may be,) in the manner of saw-teeth, two courses of brick-work salient 2 inches over the fronts of the tooth-work; and to set in and joint with equal measures of cement and river sand above the salient-work, a coping of bricks properly cut and laid raking so as to form a water-tabling, the back and front of which shall meet together at the top in a square angle.

(The tooth-work of this description of coping may be done in many different ways, so as to form a continuous dentil of bricks, laid flat-wise, edge-wise, or even upright: and a very bold and handsome character may be given to the walling, if the buttresses and salient head-work project both the same quantity; the salient-work forming between the buttresses a corbel-table or machicolation; the corbels in shallow work being each formed of a single heading brick, chamfered or rounded at the lower edge, and in bolder work each corbel may consist of three such bricks projecting each beyond the other; in shallow work the salient head-work may be carried level from corbel to corbel, with only the lower arris slightly chamfered off; but if the projection be bold, scolloped-work or machicolations may be formed from corbel to corbel of bricks moulded on purpose.)

If the walling have any projecting plinth above ground, it will be well to finish this with moulded splayed bricks (set in cement), which in

many parts of the country are to be obtained already made.

Gate-piers. To construct, in addition to the other piers and buttresses, No. gate-piers according to the drawing, faced all round with the best washed malm-facing bricks (or whatever bricks are proper to use in the locality).

Bedding. To bed in mortar and point round the stone caps, bases, and hinge-stones of the gate-piers and gates.

Bricks. The whole of the brick-work is to be composed (except where herein otherwise directed) of the very best well-burnt hard square approved stock-bricks (or of such other bricks as can be obtained, as the case may be,) without admixture of soft bricks, or broken bricks, or place bricks, or other inferior bricks.

Samples. (See p. 78).

Mortar. The whole of the brick-work (except where herein otherwise directed) is to be laid in and is to be entirely flushed up at every course of the work with mortar composed of one third by admeasurement of the best and two-thirds by admeasurement of the best sharp river sand.

Common chalk lime should seldom be used in any work, and never in a park-wall. If good river sand cannot be obtained, good clean road drift may be used instead of it.

Mode of doing the work. The whole of the brick-work is to be laid in manner of English bond; no four courses of the work are to rise more than one inch exclusive of the bricks.

Pointing. Point the whole of the work with a neat flat point.

Capping of piers. The cappings of the piers to be of stone executed according to the detail drawings with copper dowels of lead or copper to each stone 2 inches by 1 inch.

Hook-stones. Build in to each pier two hook-stones 18 inches high and the full width of the piers.

CHAPTER XV.

SPECIFICATION *for a* PALISADING *with* GATES *and foundation.*

BRICKLAYER.

Ground-work. (See p. 230 alteration of levels).

Concrete. (See p. 75).

Foundation brick-work, &c. To construct a foundation-wall for the support of the palisading of brick-work, with one course of footings 1 foot $10\frac{1}{2}$ inches thick, one course of footings 1 foot 6 inches thick, and one course of footings 1 foot $1\frac{1}{2}$ inches thick; and to carry the foundation-wall above the footings 2 feet high and 9 inches thick.

Spur-pieces. To construct and bond in with the brick-work of the foundation-wall spur-pieces not more than feet inches apart to receive the braces of the palisading.

Gate-piers and other piers (if any). To construct No. piers for the gates and for the support of the palisading of brick-work according to the drawing.

Facing, (if any). To face the piers all round, and both sides of all the other brick-work, from the surface of the ground upwards, with the best second malm stocks (or with other bricks proper to use in the locality) of uniform colour.

Bedding. To bed and point with mortar the curb and the stone blocks for the hinges and locks of the gates.

Bricks (See p. 231).

Mortar. (See p. 78).

Mode of doing the work. (See p. 78).

MASON.

Gate-piers. To provide and fix No. gate piers of the best stone, each with a base, a shaft, and a cap, each in one piece of stone, wrought and moulded according to the drawings, and with four plugs of copper 1 inch square and 2 inches long in each horizontal joint thereof.

Pier-caps. To provide and fix No. pier-caps, each formed of one piece of the best solid stone, wrought, moulded, and throated according to the drawings.

Hinge-stones. To provide and fix No. hinge-stones of the best Portland (*or other stone, as the case may be,*) each feet inches long, feet inches wide, and feet inches high, and to provide and fix at the feet of the gates, No. bases or socket-stones of Aberdeen granite, each feet inches long, feet inches wide, and feet inches high.

Curb. To provide and fix all along (such part as may be intended of) the (foundation) walling a curb of the best Portland (or other stone, as the case may be,) scantling inches by inches wrought, (chamfered, or moulded, as the case may be,) according to the drawing, run with lead at all the joints, and with a strong copper plug also in each joint.

Coping. To cover the of the walling with stone-coping of the best stone inches wide, inches thick in front, 3 inches thick at the back (*or saddle-backed or moulded, and of such scantling as may be intended*), throated at both edges, and plugged and channeled with lead to prevent wet running through the joints.

SMITH AND IRON-FOUNDER.

Palisading. To provide and fix all along the foundation brick-work an iron palisading according to the drawings, with cast-iron bars one inch square (or of such other shape as may be intended), with ornamental heads, cast (*or wrought, as the case may be,*) iron standards and braces, wrought-iron top-rail and bottom-rail (*if*

any) 3 inches by $\frac{5}{8}$ inch (*or of cast-iron* 3 *inches by* $\frac{3}{4}$ *inch, or according to the drawings,*) wrought-iron dog-bars $\frac{3}{4}$ inch square and 20 inches long, with spike-heads.

(If the iron-coping is to extend over the spur-piers, this should be notified in the specification; if the situation will so permit, each standard should have a brace cast at the back and at the front of it all in one piece, as this will save work and will render the palisading more steady, and in such case there need be no spur-piers unless the palisading be very high.)

Gates.

To provide a pair of iron-framed gates according to the drawings, with cast or wrought-iron ornamental bars corresponding with those of the palisading, stiles of wrought-iron $1\frac{1}{4}$ inch square, four tiers of wrought-iron horizontal rails 3 inches by $\frac{1}{2}$ inch, circular (*or straight, as the case may be,*) braces of wrought-iron 3 inches by $\frac{1}{2}$ inch, ornamental work of wrought-iron filled in between the bars and rails; to hang the gates with strong wrought-iron carriages, sockets, and mountings of bell-metal, a good strong lock entirely of copper, with two keys thereto, a long bolt with socket, a swivel-stop to turn down flat when the gates are open, and two latches for keeping back the gates when open.

Iron gate-standards.

To provide and fix to the gates a pair of ornamental gate-standards, framed of iron according to the drawings, with foliage and decorations of wrought-iron and margins of wrought-iron.

The iron-work is to be riveted together with copper, and is to be run with lead into the stone-work (*and iron curbs, if any*), and is to be securely run with lead at all the horizontal rails and standard-heads.

(Care should be taken, that no wrought-iron be inserted in any stone-work, on account of the bursting and certain destruction which the corosion of iron causes to all stone in which it is inserted. If the insertion of any wrought-iron braces in the stone-work be absolutely requisite, their ends should be galvanized or tinned to protect them from oxidation.)

PAINTER.

To scrape, clean, and burn free from all rust, the whole of the iron palisading, rails, gates, and gate-piers, with all the fittings and appurtenances thereof; and to paint the whole of the said iron-work five times with the best oil colour, the first two coats of painting thereto being done with red-lead paint.

The whole of the painting is to be finished of such colour as may be intended.

CHAPTER XVI.

SPECIFICATION FOR BUILDING AN ADDITIONAL WING *to a* VILLA *situate at* , *in the county of* , and *for making alterations to the present building for* .

Insert list of Working-drawings.

BRICKLAYER.

Notice, &c. to District Surveyor.

To give to the district-surveyor the requisite notice for an addition to a dwelling-house, and to pay him his proper official fee. (*This clause to be omitted if the house be without the jurisdiction of the London or other Building Act*).

Remove, &c., garden wall.

To take down so much of the present garden-walling as will require removal in order to form the intended additions to the dwelling-house; and to make good the said garden-walling up to the new building. To cut out an opening in the remainder of the garden-wall, in order to receive the present garden door-frame, and to set therein the said door-frame, and to turn an arch over the same, and make good the joists thereto as at present.

Old bricks.

To clean thoroughly from old mortar, and stack up to be used again, such of the old bricks as will result from the intended alteration to the present brickwork which remain perfectly sound, undecayed, unbroken, of the quality of stock-bricks, and fit to be again used.

Digging, &c.

To excavate the ground for the formation of the intended additions to the basement-story of the house, and its offices and appurtenances, and for the drainage and the dry-areas and other areas thereof, and also for the laying of the several foundations of the intended new works, and for the performance of such of the other works of the buildings as will of necessity require excavation; to beat down, ram, and render hard and level the bottoms of all the trenches for the foundations of the intended new walls; and when the

brick-work is executed, to fill in and consolidate the ground in and about the walls and other brick-work as may be found requisite according to the situation and the nature of the work.

Concrete. (See p. 75).

Cartage and rubbish. (See p. 76).

Brick-work. (See p. 77).

Double walling. (In damp or exposed situations, as in basement-stories, or where from the climate during rains, water is liable to soak through the walls, double walling is necessary; the inner and outer wall being tied together with bonders in every course; thus, in a wall two bricks thick the wall should be built with $13\frac{1}{2}$ inch outside wall, 2 inch cavity, and $4\frac{1}{2}$ inch inside wall).

Alterations, &c. to the present building. To take out the present door and door-frame of the basement external entrance; to cut out for a new basement external doorway in the situation shown by the drawings; to fix therein the old door and door-frame; and to stop up and make good, in a workmanlike manner, with new brick-work, the present aperture; and in like manner to make good round the new doorway, and to turn an arch over the same.

To alter and enlarge the way down to the basement external entrance, in the manner shown by the drawings; and to put thereto all requisite additional brick-work.

To take out the present windows of the north-eastern room on the basement-story, and to re-fix the same in new apertures in the situations shown by the drawings; to make good the brick-work round the same, and to turn arches thereto in a workmanlike manner; and to move and make good the brick-work of the area thereto.

To build a new brick wall to divide the intended new dairy from the office-passage, with foundation 18 inches below the upper surface of the basement-floor, and consisting of two courses of 18 inch brick-work, and two courses of 14 inch brick-work; and to cut away the projections from the old brick-work in the intended northern extension of the basement-passage,

and to make good the brick-work so as to be proper for receiving the intended plastering and other finishings thereto.

Damp course.

To build into the walls, at the level of plates of basement floor, a double course of Welsh slates, the full thickness of walls set in cement and breaking joint properly to prevent the damp from rising.

(A cheaper sort of damp-course can be obtained by using a layer of gas-tar and sand in equal proportions, and this can be recommended where the material is to be readily obtained).

To construct proper supports of brick-work for the slabs in the intended new dairy.

To fill in with brick-work the opening in the basement-wall leading to the present staircase, and to make good the other adjacent brick-work, after the present basement-stairs and the fittings therewith connected are removed.

To cut out in the situations shown by the drawings, and make good thereto, openings from the three stories of the present building to the intended new wing-building; and to turn arches over the several new openings in a sound and workmanlike manner.

To alter and make good to the kitchen-flue as may be found requisite in consequence of the intended alterations.

To take down the present breast-walling under the present verandah, and to build new breast-walling, as shown by the drawings, as well to the old verandah as also to the intended new verandah; to construct to the said walling abutment arches as shown by the plan and sections, and to cut out the brick-work for the reception of the back edges of the stone landings, and to make good thereto with sound new brick-work.

Make good floors, gutters, &c., &c., &c.

To take down the chimney-stack in the present drawing-room, and in the chamber above the same, with the shaft thereof; and to construct, according to the drawings, a new chimney-stack on the north side of the drawing-room, and on the north side of the chamber above the same, with shaft trimmers and the

other requisite appurtenances, to correspond with the present chimneys at the south-eastern part of the building; and to make good in a workmanlike manner all the brick-work damaged by the removal of the present chimneys.

General brick-work.

To execute in the very best manner all brick-work requisite for carrying into effect the intended additions, and other works and alterations, according to the drawings, and so as to render the whole house, with its offices and appurtenances, complete and finished in every respect.

Iron hooping.

To provide and work up in the new foundations, and in such other parts of the new brick-work as the architect may direct, 10 cwt. of strong vat-hooping in order to strengthen the work.

Rubbed and gauged arches.

To turn over the several windows, and other openings in the intended new brick-work, arches with proper skew-backs; to form counter-arches under the several openings, where the nature of the work will admit thereof; and to turn arches over the several apertures intended to be made in the present brick-work; to be rubbed and gauged wherever they show on the outside.

Chimneys.

To properly turn, parget, and core all the flues, to put to each new fire-place a chimney-bar of wrought-iron 3 inches by $\frac{1}{2}$ inch properly corked at the ends thereof, and to put to each fire-place, except to those on the basement, a trimmer of 4 inch brick-work.

To carry up all the chimney-shafts according to the drawings.

Indents, &c.

To cut proper perpendicular indents in the old brick-work where requisite, in order to receive the intended new brick-work, and to make good in a workmanlike manner all damage caused by cutting the indents.

Bedding.

To bed in mortar all the plates, lintels, wood-bricks, templets, and other work so requiring; to bed and point round with lime-and-hair mortar all the door-frames and window-frames; and to back up to,

and make good with solid brick-work, all timbers, stone-work, and other things to be set in the brick-work.

Piers. To put under the sleepers of the flooring brick piers each consisting of two courses of brick-work 9 inches square and four courses of brick-work 9 inches by 4 inches.

Cross walls. To put under the joints of the paving of the new dairy, and of the closets, and other parts of the basement-story intended to be paved, 4 inch brick-cross walls 12 inches high.

Brick paving. To pave with hard stock-bricks laid flat in mortar, and grouted also between the joints with liquid mortar, the whole of the intended areas, as well as those under the verandahs as at the other parts of the basement-story, and the whole of the intended new coal-cellar.

Point old fronts. To erect scaffolding against the present fronts of building, rake out joints, wash and stain the brick-work, and tuck joint with white pointing, gauged arches to be stopped with cement, and leave all perfect at the completion of works.

Air-gratings. To provide and fix in the new brick-work 10 cast-iron air-bricks for the ventilation of the floors.

New drains. (See p. 77).

1 Rod extra brick-work. (See p. 78).

Bricks and mortar. (See p. 78).

Mode of doing the work. (See p. 78).

Lime-whiting. To lime-whiten twice the areas round and opposite to the windows of the additions to the basement-story.

Jobbing-work. (See p. 78).

MASON.

Paving. To take up the present paving of the verandah, and to use the sound parts thereof in paving the intended new dairy, the new office-passage, and the store-

room, and other parts of the basement-story which are not intended to be paved with brick, or to be floored with wood; and to provide sufficient new 2 inch Yorkshire stone, and to complete therewith the whole of the said rooms, passage, closets, and other parts of the basement-story; the whole of the said paving is to be laid in regular courses, and is to have the joints thereof wrought quite fair through the whole thickness of the stone.

Covering to dry-area.

To cover the dry-area next the kitchen-garden with 3 inch tooled Yorkshire stone, with close tooled joints and outer edges; and to let thereinto the gratings to the windows of the servants' hall and office-passage.

New verandah floors.

To put to the present verandah, and to the upper and lower verandahs of the intended new wing-building, entire floorings of the very best sound new Portland stone 4 inches thick, of the several widths and forms shown by the drawings; the whole of the said flooring is to have joggle-joints in the situations shown by the plans effectually run with lead.

The upper verandah-flooring is to be moulded in front as shown by the drawings; and the other verandah-floorings are to be wrought with square edges, and are to be throated.

Steps and landing.

To construct, according to the drawings, to the lower verandahs, steps scantling 6 inches by 13 inches, and a landing 4 inches thick, all of the best solid Portland stone, each step in one piece, and the whole to be securely fixed on brick foundations.

External basement-steps, &c.

To take down the present external basement-steps, and to alter, adapt, re-fix, and make the same complete, so as to suit the basement-entrance as intended to be altered in situation; and to re-lay and make complete the paving at the head and foot of the steps, providing all requisite new materials.

Internal basement stairs.

To construct a new basement-staircase according to the drawings, with treads and risers of 3 inch Yorkshire stone, with fair tooled edges.

New Portland stone principal stairs.

To construct a new staircase from the ground-floor to the one-pair-story, with the steps and semi-circular

landing, entirely of solid Portland stone, tailed 9 inches into the brick-work, with moulded returned nosings, and the steps from the semi-circular landing upwards (where the soffits thereof come in view) having the moulded nosings thereof returned also at the back, and with the soffits also moulded all over to the shape of the ends of the steps.

Window-sills. To put to the windows of the intended new principal staircase, butler's-room, new chamber, new dressing-room, two new water-closets, and the store-room on the ground-story, and to the blank external recesses on the west side of the intended new wing-building, sills of the best Portland stone 9 inches by 5 inches, properly sunk, weathered, and throated.

Sills of basement story. To put to the new windows of the basement-story sills of 3 inch Yorkshire stone 10 inches wide, wrought with fair edges, throated, and laid sloping.

Chimney-pieces. To lay in the hall and closets a Minton's or Maw's $4\frac{1}{4}$ inch impressed tile floor, run in cement. A proportion of encaustic tiles will be used, as shown in the drawing. The whole to be laid upon the rough flooring described in carpenter.

To take down, clean, repair, re-polish, re-fix, and make complete to the intended new chimney, the chimney-piece of the north-east room on the one-pair-story.

To put to the chimney in the new butler's room mantle, jambs, and shelf, of $1\frac{1}{4}$ inch Portland stone 6 inches wide, and to put to the chimney in the new servants'-hall $1\frac{1}{2}$ inch Portland stone mantle, jambs, and shelf, 7 inches wide, and to put to each of the last-mentioned chimney, slabs of the best Portland stone 2 inches thick.

Hearths To put to each of the new chimneys a back hearth of the best rubbed 2 inch Yorkshire stone, and hearths of $1\frac{1}{2}$ inch Portland stone, of the size shown on drawings.

Dairy. To form all round the intended new dairy in the basement-story a complete shelf, dresser, or platform, as shown by the drawings, consisting of slabs of smooth slate in large pieces, and full $\frac{1}{2}$ inch in thickness, and

with a skirting of similar slate, 6 inches wide, carried all round against the brick-work at the back of the shelf.

Sundries. To cut out the stone-work where requisite for the insertion of the iron-work, and for all pipes, and wherever else may be requisite for the proper completion of the whole of the works of every kind.

Sink-stones. To provide and fix in the pavings, where the architect shall direct, four five-hole sink-stones, each properly dished out of a piece of 4 inch Yorkshire stone 12 inches square.

Jobbing-work. To perform to the building, and its offices and appurtenances, all such work and labour as may be requisite thereto in the nature of jobbing, as well to the new works, as also in adapting and completing the old works to the same.

SLATER.

Countess-slating. To cover the whole of the sloping roofing of the addition-building with the very best strong countess slates on battens, properly nailed with two copper nails to each slate, with $2\frac{1}{2}$ inch bond.

Nails, bond, &c. The joints of the slating over the bow-wing of the building are to be radiated to the apex of the roof. The eaves and the heading-courses to have proper bond, with cut slates, instead of having slates laid lengthwise with slips or smaller slates between them.

Reparation. To repair, make good, and leave perfect, to the satisfaction of the architect, all the new and old slating of the villa and of its additions.

CARPENTER AND JOINER.

New materials, &c. To provide new materials for, and frame, fix, and finish all carpenter's work and joiner's work which may be requisite for carrying into effect, according to the drawings, the intended additions, alterations, and works to the dwelling-house, and to the offices and appurtenances thereof.

Ironmongery, &c. To provide for the carpenter's work and joiner's work, and use and fix thereto, all requisite spikes, nails,

screws, and other proper ironmongery, and all requisite brass-work; the whole of the ironmongery and brass-work are to be of the very best quality.

Timber and deal.

All the oak timber is to be of the best English growth, except where otherwise described; all the other timber is to be either Dantzig, Riga, or Memel yellow fir; all the boards and joiner's work are to be of the best yellow Christiana deal, except where herein otherwise directed; all the timbers and deals are to be cut out perfectly square, and entirely free from the very least quantity of sap-wood, and from shakes, large knots, wany edges, and all other defects: none of the floor-joists, ceiling-joists, rafters, and quarters, are to be respectively more than 12 inches apart.

Old materials.

Such of the timbers and other wood-work to be of necessity taken down and removed, in order to make to the building and to its appurtenances the intended additions and alterations, may be used again in the performance of the intended works, so far as the said old timber or other wood-work may agree with the thicknesses, scantlings, quality, and workmanship of the intended works described in this specification.

Sundries.

To provide and fix all requisite shores, struts, puncheons, oak-wedges, ties, cletes, beads, stops, fillets, tilting-fillets, backings, blocks, linings, casings, firrings, and rolls; to provide all moulds, rods, and patterns requisite for setting out and for executing accurately all the several intended works of the dwelling-house, and of the offices and appurtenances thereof. (See p. 82 for framing and other labour.)

4 cwt. iron ties, &c.

To provide and fix in and about the intended works 448lbs. avoirdupois of wrought-iron in such straps, ties, screw-bolts, and other light wrought and hammered work as the architect may direct; all additions to the said quantity, and all deductions therefrom, are to be taken after the rate of 6*d.* per pound avoirdupois, including the fixing thereof.

Centering.

(See p. 97).

Wood-bricks.

To put all wood-bricks requisite for fixing the finishings.

Lintels.

To put to all the windows and other openings re-

quiring the same, fir lintels, not less than 4 inches high, and 1 inch more in height for every 2 feet beyond an opening of 4 feet, and as wide as required by the brick-work.

Basement-flooring.

To construct to the new servants' hall, and to the closets thereto attached, the flooring with oak sleepers 4 inches by 3 inches, and fir joists 5 inches by $2\frac{1}{4}$ inches, and to lay the same with $1\frac{1}{4}$ inch yellow deal wrought flooring-boards, listed clear from sap-wood.

Repairs, alterations, and making good to the present basement-flooring.

To take up the boarded floor upon the site of the intended new dairy, in order to admit of the intended paving thereto, and to repair and make complete the flooring to the office-passage, and to the remainder of the basement-story, where any alterations or damage will occur.

Ground-flooring.

To construct the ground-flooring to the intended new dining-room, new butler's room, new store-room, and to the closets and lobby thereto attached, with joists 9 inches by $2\frac{1}{2}$ inches, trimmers and trimming-joists 9 inches by 3 inches, and wall-plates 5 inches by 4 inches; and to lay the whole of the same with $1\frac{1}{4}$ inch yellow clean deal flooring-boards, listed free from sap-wood, sawn down the middle, and laid in half-boards not more than 4 inches wide.

All the parts of the timbers of the ground-flooring which are laid in the external brick-work are to be thoroughly pitched, to prevent the same from being rotted.

Flooring to new hall, &c.

To take up the present boarded flooring to the hall; to repair the present timbers of the flooring; to put in new timbers sufficient for completing the naked flooring in a corresponding manner, and to lay the whole of the same, including the four closets, with $1\frac{1}{4}$ inch yellow deal rough floor at a proper level, so that the tile floor may be laid upon it.

Repairs to old ground-flooring.

To make good, in a complete, neat, and workmanlike manner the floor of the drawing-room, and the other parts of the ground-flooring where any alterations are intended to be made thereto, so that the said floorings, when made good, may have an uniform appearance, without patches therein.

One-pair-flooring. To construct the one-pair-flooring of the intended new boudoir, new chamber, new dressing-room, and of the closets and landing thereto attached, with joists 11 inches by $2\frac{1}{4}$ inches, trimmers and trimming-joists 11 inches by $2\frac{3}{4}$ inches, two tiers of herring-bone struts between the joists, and wall-plates 5 inches by 4 inches; and to lay the whole with $1\frac{1}{4}$ inch yellow deal flooring-boards, as described to the ground-story.

Repairs to one-pair-flooring. To fill in the flooring of the one-pair-story to the well-hole of the present staircase, and to the other parts of the one-pair-flooring of the present building where any alterations are intended to be made thereto; and to render the whole of the one-pair-flooring of the present building in all respects complete and perfect, as described for the ground-flooring.

Flooring to the principal staircase, &c. To construct the flooring to the principal staircase and the corridor on the one-pair-story, and to the two new water-closets, with fir joists 7 inches by $2\frac{1}{4}$ inches, trimmers and trimming-joists 7 inches by $2\frac{3}{4}$ inches, and to lay to the same $1\frac{1}{4}$ inch yellow deal flooring, as described for the new dining-room.

Sound-boarding. To put to the whole of the floorings of the intended new wing-buildings sound boarding of $\frac{3}{4}$ inch deal, properly chopped and fixed upon fillets, for the reception of the pugging.

Roofing. To construct the roofing over the intended new wing-building with timbers and other work of the following description:

	Ins.	Ins.
Wall-plates	4 by	4
Rafters	4	$2\frac{1}{2}$
Three tie-beams	12	$4\frac{1}{2}$
Ridge and hips rounded for lead	9	$1\frac{1}{4}$
Angle-ties and dragons	4	3
Slate-battens	$2\frac{1}{2}$	1
Feather-edge lear-boards 6 inches wide.		
Ceiling-joists in one length firmly spiked beneath the tie-beams	3	2
Ceiling-joists to the dressing-room ...	4	2
Ceiling-joists to the boudoir firmly spiked to the sides of the rafters	5	$1\frac{1}{4}$
Circular segmental-cradling to the boudoir		

	Ins.	Ins.
in two thicknesses of inch deal firmly secured to the ceiling-joists.		
Joists to the flat between the old building and the other new roof	5	$2\frac{1}{4}$
Wall-plate under ditto	4	4
Inch yellow deal boarding for lead listed free from sap-wood, laid with firrings to a current of not less than $1\frac{1}{2}$ inch to every 10 feet, and with rolls for the joints of the lead, and inch deal riser next the eaves of the adjoining roof.		

Gutters, eaves, fascia, &c.

To form all round the new building a gutter, according to the drawings, with inch deal bottom laid to a current of not less than $1\frac{1}{2}$ inch to every 10 feet, inch deal soffit-board upon strong cut brackets inserted 18 inches in the brick-work, $1\frac{1}{4}$ inch fascia-board with solid moulding thereon, $\frac{3}{4}$ inch deal inside lining next the rafters, and sufficient strong wrought-iron securing-ties from the fascia to the roof.

Quartered partitions of new wing.

To construct the quartered-partitions of the intended new wing, according to the drawings, with timbers of the following scantlings :—

	Ins.	Ins.
Top and bottom plates	4 by	4
Plates above the doors	4	$5\frac{1}{2}$
Struts above and below ditto	3	$3\frac{1}{2}$
King-posts and queen-posts	4	7
Door-posts and door-heads	4	$3\frac{1}{2}$
Quarters	4	2
Two tiers of inter-ties to each partition ...	3	$1\frac{1}{4}$

Remove, &c., old quartered-partitions, &c.

To take down the quartered-partitions with the doors and other fittings now separating into a chamber a dressing-room and a lobby the intended enlarged north-eastern chamber ; to remove the door-dressings, and to fill in with quarters the door-way in the quartered-partition at present leading into the next chamber, and the present door-way leading into the south-west chamber.

New quartered-partitions in present building.

To construct and put up in the present building a quartered-partition to form a passage to lead to the northern wing thereof, with timbers of the following scantlings :—

	Ins.	Ins.
Upper and lower plates	4 by	3
Centre suspending post	4	7
Outer ditto	4	5
Struts	4	$3\frac{1}{2}$
Quarters	4	2
Two tiers of inter-ties	3	$1\frac{1}{4}$

To inclose the corridor leading from the intended new principal staircase on the one-pair-story, through into the old building; and to inclose also the closets thereto attached by quartered-partition with plates 4 inches by 3 inches, posts 4 inches by $3\frac{1}{2}$ inches, braces 3 inches by 4 inches, quarters 4 inches by 2 inches, and three tiers of inter-ties 3 inches by $1\frac{1}{4}$ inches.

Skirtings.

To put round the intended dining-room, staircase, boudoir, chamber, dressing-room, new entrance-hall, and the lobbies and corridors thereto attached, moulded skirtings as severally shown by the drawings.

To fit up all the new closets and all the remainder of the intended new additions to the house above the basement-story with inch deal chamfered skirting 8 inches high.

The whole of the skirtings are to be fixed with the requisite ploughed grounds and substantial backings.

To make good in the most complete, neat, and workmanlike manner, all the skirtings of the old building wherever any alterations are intended to be made.

Pilasters.

To fit up, as shown by the drawings, the addition to the entrance-hall, the corridor over the same, and the several lobbies, with pilasters of $1\frac{1}{4}$ inch deal free from shakes and other defects, and fixed with the requisite grounds and backings.

Columns and removing partition between the present dining-room and present drawing-room.

To take down the whole of the quartered-partition between the present dining-room and the present drawing-room, in order to unite the two rooms so as to form a large drawing-room, and to insert under the floor of room above two breast-summers each 11 inches by 4 inches, and 2 feet 6 inches longer than the opening, bolted together with $\frac{1}{2}$ inch bolts every 18 inches of their length.

Cradling. To form out with cradling of $1\frac{1}{4}$ inch deal under the ceilings to the intended enlargement of the entrance-hall, to the corridor immediately over the same, to the principal staircase, and to the lobbies thereto adjoining, in an accurate manner, according to the drawings, in order to receive plasterer's work to give the appearance of panels upon or under the ceilings.

To put proper cradling in two thicknesses of inch deal very securely fixed, in order to receive the arched ceiling of the boudoir and the domed ceilings of the principal staircase, and of the lobbies by the boudoir and dining-room.

To form sunk coffers in the ceilings for the reception of the intended five flowers.

Water-closets. To take up and remove the seat riser and other carpenter's work and joiner's work belonging to the present water-closet on the ground-story of the house; and to clean, repair, alter as may be required, make all requisite additions thereto, and adapt, re-fix, and make the same complete and perfect in the situation on the ground-story shown by the drawings.

To fit up the intended new water-closet on the one-pair-story of the new wing, with inch best handsome Spanish mahogany risers, eat, and clamped flap and frame, the flap moulded on the edge and hung with a pair of 2 inch strong brass hinges fixed with brass-headed screws.

To put to the two water-closets all requisite bearers, blocks, and other fitting, and to attend upon and assist the plumbers while fixing the apparatus and other appurtenances of the water-closets.

To provide and fix casings of inch deal to conceal all the pipes of the water-closets, screwed together so as to allow of removal.

Staircase. To fit up the intended new staircase with the mahogany hand-rail of the present staircase, cleaned, adapted, repolished, and made complete, with the requisite additional hand-rail of similar quality, and with all requisite joint-screws; and to provide and

fix to the same staircase ornamental balusters of turned mahogany, according to the drawings.

To inclose under the principal stairs and round the head of the new basement-stairs with $1\frac{1}{2}$ inch moulded and square-framed spandril-partitioning, with an opening left therein for the door to lead down to the basement-story.

Steps leading to the new boudoir, &c.

To form of $1\frac{1}{4}$ inch deal the steps leading up to the lobby adjoining the intended new boudoir, with strong bearers and with moulded nosings.

Doors.

To put to the intended new dining-room, to the intended new boudoir, to the intended new chamber, and to the intended new dressing-room, 2 inch six panel doors, moulded on both sides, and framed according to the drawings, and hung each with a pair of 4 inch butt-hinges, and a very best strong and perfect mortise-lock, with ebony furniture.

To put to the intended butler's-room, to the intended new store-room on the ground-story, to the intended two new water-closets, to the doorway leading down to the basement-story, and to all the intended new closets on the ground-story and one-pair-story, new 2 inch doors, framed each in four panels (except where otherwise shown by the drawings), with moulded fronts and square backs, and hung with $3\frac{1}{2}$ inch butt-hinges, each of the closet-doors in the entrance-hall hung with three hinges, and each of other doors hung with two hinges. To put to each of the doors of the butler's-room, store-room, and water-closets, a best mortise-lock, with furniture complete, as described to the 2 inch doors; to put to the store-room a strong 7 inch best iron-rimmed lock, with plain strong brass furniture; and to put to each of the new closet-doors a best strong iron-rimmed 5 inch closet-lock, with two keys and a brass escutcheon.

To put at the bottom of the principal staircase a $2\frac{1}{2}$ inch external door, moulded on both sides, with a moulded sash, and $1\frac{1}{4}$ inch shutter thereto, framed in two panels, bead-flush on both sides, and with wrought-iron corner-shoes, two stubs with plates, two strong thumb-screws, and a sunk shutter-lift, and to hang the door with a pair of 4 inch butt-hinges, two 10 inch bright barrel-bolts, and a very strong 9 inch draw-

back brass-mounted lock, and cast-iron centre door, handle to choice.

To fit up the intended new servants' hall, closets, and other parts of the basement-story, with the old doors, which from the intended alterations to the present building will become unnecessary to the other parts of the house, each of the said doors after being properly repaired and made perfect being hung with the requisite new hinges, locks, and other appurtenances, the present hinges, locks, and other appurtenances thereof, being, however, used again after being cleaned and made perfect, and the brass work thereof re-lacquered.

To take out the present door-frame and fan-light of the front entrance of the house, and to alter as occasion may require, and re-fix the same close to the interior of the entrance-hall, so as to leave an external porch, and to re-hang and make complete the doors and the fittings and appurtenances thereof.

Door-linings, architraves, &c.

To fit up the new doorways of the basement-story and of the one-pair-story, with all door-linings and dressings, as far as the same will go, to be taken down from the present house in consequence of the intended alterations, but repaired, adapted, and made in all respects complete.

To put to the external doorway of the staircase a fir proper door-case 5 inches by 5 inches, tenoned at bottom into a stone step, and with a piece of 4lb. milled-lead 15 inches square wrapped round the tenons thereof, and to put to the same doorway $1\frac{1}{4}$ inch tongued and beaded linings.

To put to all the remainder of the doorways of the house new $1\frac{1}{4}$ inch double rebated door-linings, those of them which will be more than $10\frac{1}{2}$ inches wide being framed, each set in three panels to correspond in finish with the doors; to put on each side of each doorway inch deal framed door-grounds 5 inches wide, with six inch deal dove-tailed braces to each doorway; and to put to all the same doorways moulded architraves as shown by the drawings, those of them, however, which do not require extra projection in order to stop the skirting, having the mouldings laid upon the door-ground without additional faces.

New windows.

To put in the bow-fronts of the intended new dining-room and intended new boudoir $2\frac{1}{2}$ inch deal moulded circular French folding-sashes, hung with hinges, fastenings, espagnolette bolts, and other ironmongery, of quality equal to those of the present drawing-room windows, and in fir proper frames 6 inches by 5 inches, with oak double sunk sills.

To put to the intended new chamber new dressing-room, and new staircase, 2 inch deal moulded sashes, double hung with the best large patent lines, iron weights, the best brass axle-pulleys, and the best patent spring-fastenings, in deal cased-frames with oak double sunk sills.

To put to the intended new butler's-room, two new store-rooms, new servants' hall, and two new water-closets, and to the intended window of the dressing-room attached to the present south-east chamber, $1\frac{1}{2}$ inch deal ovolo sashes, double hung with the best large patent lines, iron weights, the best brass axle-pulleys, and the best patent spring-fastenings, in deal cased-frames with oak double sunk sills.

Old windows.

To repair thoroughly, re-fix, and make complete, the present windows of the office-passage and of the intended dairy.

Shutters, &c.

To fit up the windows of the intended new dining-room, new boudoir, new chamber, and new dressing-room, according to the drawings, with $1\frac{1}{4}$ inch one-panel moulded, soffits, backs, and elbows with beaded cappings, $1\frac{1}{4}$ inch two-panel bead-flush back linings, $1\frac{1}{2}$ inch moulded and bead-flush front shutters, and $1\frac{1}{4}$ inch bead-flush, and square framed back-flaps, the front shutters and back-flaps hung in two heights, with strong hinges and with strong fastenings, the same as to the present drawing-room, in $1\frac{1}{4}$ inch proper boxings, with mouldings thereon, in order to form architraves according to the drawings.

Window linings, &c.

To fit up the windows of the intended new butler's-room with $1\frac{1}{4}$ inch one-panel square framed soffits, backs, and elbows with beaded cappings, $1\frac{1}{4}$ inch two-panel square framed back-linings, and $1\frac{1}{4}$ inch square framed shutters and back-flaps, with $\frac{3}{4}$ inch panels, hung in two heights, with strong hinges and

strong bar fastenings, in $1\frac{1}{4}$ inch proper boxings with mouldings thereon, in order to form architraves according to the drawings.

To fit up the intended two new water-closets with $1\frac{1}{4}$ inch square framed three-panel window-backs with $\frac{3}{4}$ inch panels, and $1\frac{1}{4}$ inch square framed shutters hung as sashes, with large patent lines, iron weights, brass axle-pulleys, and screw-fastenings, in proper deal cased-frames with architrave-mouldings, and cover-boards hung upon hinges.

Window-linings, &c. To fit up the window of the principal staircase with rebated angle staff beads $1\frac{1}{2}$ inch diameter.

To fit up the new windows of the servants'-hall, the other windows of the new parts of the basement-story, and the windows of the new store-room on the ground-story, with inch deal tongued and beaded linings and window-boards, with proper bearers and backings.

Closets. To inclose the four closets in the intended enlargement to the entrance-hall with $1\frac{1}{2}$ inch deal, framed and beaded; and to perform all work and labour requisite in order to construct, according to the drawings, the several other intended closets.

Shelves, &c To put in each of the intended new closets and store-rooms four tiers of shelves of inch deal, securely fixed with the requisite brackets and bearers; in the shallow closets the shelves are to be as wide as the whole depth of the closet; the bottom shelf at the end of the store-room on the ground-story is to be 18 inches wide: all the other shelves are to be 10 inches wide.

To remove from the present butler's-pantry the closets and the other fittings thereof, and to repair, make complete, and refix the same in the intended new butler's-room.

Bulk to basement external entrance. To form a bulk-head of $1\frac{1}{2}$ inch yellow deal grooved, tongued and beaded, to inclose and divide the external entrance to the basement-steps from the present larder.

Old verandah. To take down the whole of the present verandah

of the house, and provide and fix, according to the drawings, new ornamental cast-iron columns, brackets, and girders, firmly secured to the stone-landing at base and run with lead, with crown plate and 2 inch moulded skylight to receive the intended plate-glass near the summit of the verandah; and to cover the whole of the circular part of the top of the same verandah with zinc sheeting, weight 14 oz. to the foot superficial, properly dressed and secured like the present covering; and to put along the front of the house at the upper edge of the verandah-roof a flashing 6 inches wide of zinc, weight 16 oz. to the foot superficial.

New verandahs.

To provide and fix all round the two stories of the bow-front of the intended new wing-building, columns, brackets, and girders, all of ornamental open cast-iron work, according to the drawings, formed so as to support securely the roof and the stone-landing of the upper verandah, and so as to form frame-work in order to receive Venetian blinds; the whole of the said iron-work is to be securely fixed, and is to be run with lead into the stone-work; four iron tie-rods $1\frac{1}{4}$ inch in diameter, are to be carried from the circular plate or architrave of the upper verandah into the brick-work of the bow-front, in order to prevent the rafters of the roof of the house from thrusting the verandah away from the remainder of the building, and the inside of the plate or architrave of the upper verandah is to be lined with $\frac{3}{4}$ inch yellow deal, finished on the top with a moulding. (*In this case the roof of the house was to extend over and to form a covering to the upper verandah.*)

Jobbing-work.

(See p. 103).

40 cubic feet of fir extra.

(See p. 89).

PLASTERER.

Pugging.

To fill in upon the sound-boarding between the joists of the whole of the new additional wing-building of the house, with good lime-and-hair pugging mortar, laid in every part thereof full one inch thick.

L. P.

To lath and plaster with one coat of lime-and-hair a ceiling to the intended new coal-cellar.

L. P. S. W. To lath, plaster, set, and whiten ceilings to all the remainder of the basement-story.

L. P. F. S. and colour. To lath, plaster, float, set, and colour ceilings to all the remainder of the intended additions to the house, and to the additions to the entrance-hall and closets, and to the corridor and the closets in the present building on the one-pair-story; the ceiling of the boudoir is to be arched, and the ceilings to the lobbies leading to the dining-room and to the boudoir and the ceiling to the arched end of the principal staircase, are to be domed; and the ceiling to the upper verandah is to be conical, to suit the circular and ascending disposition of the rafters.

Beams, architraves, &c. To execute under the ceilings to the intended enlargement of the entrance-hall, to the corridor immediately over the same, to the principal staircase, and to the lobbies thereto adjoining, in an accurate manner, according to the drawings, the panels in the ceilings, and to render uniform the decorations of the said ceilings.

Cornices. To execute to the new dining-room, new boudoir, new chamber, new dressing-room, new staircase, and to the intended enlargement of the entrance-hall, and to the lobbies and corridors therewith connected, the several moulded and enriched cornices, according to the drawings, with proper enriched honeysuckle and other mitres thereto.

Flowers. To put in the ceilings five enriched flowers, according to the drawings, with proper sunk coffers and moulded and enriched frames, complete models of the said flowers being deposited with the architect.

Modelling, capital, &c. To form, according to the drawings, moulded and panelled pilasters and trusses, with enrichments as shown, to be left in the possession of the architect; and to provide and fix copies thereof in plaster to the two ends of the breast-summer dividing the drawing-room; and to form above the same pilasters, &c., an architrave with enriched soffit; and to make good the cornices and other plastering which will be destroyed or injured by uniting the present dining-room and the present drawing-room.

To provide in like manner models for the pilaster-

capitals according to the drawings, and to deposit the same with the architect; and to finish the several pilasters with plaster casts thereof.

To put at the heads of the pilasters in the lobby leading to the boudoir four plaster enriched trusses, according to the plaster model, to be deposited with the architect.

R. S. C. basement, butler's-room, and store-room. To render, set, and colour the whole of the internal brick-work of the intended new basement-staircase, new servants'-hall, new office-passage, and new closets and new store-room on the basement-story, and the whole of the brick-work of the butler's-room and of the closet and store-room adjoining thereto.

L. P. F. and set to sides. To lath, plaster, float, and set for paper-hanging all the remainder of the quartered-partitions and sides of the intended new works.

R. F. S. to sides. To render, float, and set for paper-hanging, all the remainder of the internal new brick-work of the house.

Beads, quirks, &c. To run and execute all requisite beads, quirks, external angles, and arrises in Keene's cement for interior work.

P. C. skirting. To put all round the new parts of the basement-story skirting, composed of 2 parts of Keene's cement to one part of plaster, $8\frac{1}{2}$ inches high and one inch thick.

Jobbing-work. To make good in a thorough and workmanlike manner all damage of every kind which, by the execution of the intended works, will be caused to the plastering of the present building; and to perform to the new building and to the present building all plasterer's work requisite thereto in the nature of jobbing, in order to complete the intended new works, and to connect properly therewith the old works.

SMITH AND PLUMBER.

Gutters. (See p. 105).

Step-flashings. (See p. 105).

7lb. milled-lead to eaves'-gutter, wing, chimney-gutter, and flats. 5lb. milled-lead flashings. Line the eaves'-gutter with 7lb. lead, and put milled-lead 5lb. flashings 6 inches wide against parapet and 9 inches wide against roof, laid with a fall to rain-water-pipes.

Water-closets. No. 1 new water-closet and apparatus (see p. 105). The present water-closet apparatus, which is to be used below, to be made good in every respect, and left in perfect working order.

Butler's-sink. Line the butler's-sink with 7lb. lead properly turned over and nailed at sides, with bell-trap and connection with drains. Lay on from cistern a $\frac{3}{4}$ inch service-pipe and brass-cock complete (or a stoneware sink should be provided, similar to sink p. 81).

Cistern. To make the necessary preparations in the present cistern for supplying the new water-closets and butler's-sink, and leave all perfect and water-tight.

Rain-water-pipes. Provide and fix No. 6 rain-water-pipes 4 inch diameter of cast-iron, with approved plain beads and all necessary bands, ears, and wall-nails, and connections with drains.

Provide bell-traps to sink in scullery and to gratings in yard, to be carefully soldered down.

Grates. To provide and set to each of the best rooms grates, average price £4 10*s*.

To provide and set to all other rooms grates, average price £1.

PAINTER.

To knot, stop, pumice, smooth in every part thereof, prepare properly, and paint four times with the best oil and white-lead colours, the whole of the new internal and external wood-work and iron-work; and to prepare, bring forward, and paint in like manner four times, with the best oil-colour. all the old works.

GLAZIER.

Plate-glass.

To glaze with the very best British plate-glass the whole of the windows of the intended new dining-room and of the new boudoir, and the external door of the new principal staircase.

To glaze in like manner with British plate-glass in squares 15 inches wide and 2 feet long, the whole flat-top of the present verandah of the house, after the same has been raised and widened.

Best Newcastle glass.

To glaze with the very best Newcastle crown glass the whole of the sashes of the intended new chamber, of the new dressing-room, of the two new water-closets, and of the window of the dressing-room adjoining to the old south-east chamber, the lower row of panes of the last-mentioned window being ground.

2nd Newcastle glass.

To glaze with good second Newcastle crown glass all the remainder of the intended new windows and lights; the glazing the new store-room on the ground-story is to be ground.

Repairs, cleaning, &c.

To cut out all the glass of the whole of the house and of the offices thereof now broken, and all the glass which during the progress of the works may be broken; and to make good all the same with new glass to match properly the old sound glass.

To clean and leave perfect, at the final rendering up of all the works as complete, the whole of the glazing of the house and of the offices thereof.

CHAPTER XVII.

SPECIFICATION OF THE WORKS *to be done in erecting and completing fit for occupation a* MANSION, *with the offices and appurtenances thereof, for , at*

BRICKLAYER.

Clearing the site. (If the site of the buildings have to be cleared, insert a clause accordingly, for which see p. 217).

Digging, cartage, &c. (Insert this clause according to the nature of the site and buildings. See p. 217).

Concrete. (See p. 75).

Rubbish. (See p. 76).

General brick-work. (See p. 76).

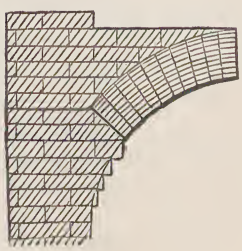
Samples: (See p. 78).

Rough arches and counter-arches. (See p. 76).

Gauged arches. (See p. 76).

Vaults. To construct to the coal-cellar, wine-cellar, beer-cellar, and basement-passage, arched and groined vaultings, according to the drawings, with the groin-points, or arrises accurately cut, and with the spandrils of the arches in all cases filled in with brick-work up to the level of the internal crown of the vaulting. The whole of the vaulting is to be completely grouted in a solid manner with liquid mortar, and, when the centering is removed, the whole of the vaulting is to be neatly pointed quite fairly and evenly.

(In vaultings the author has adopted with good success the method shown in sketch, of corbeling out of the springing walls gradually to the proper curvature, till the arch-work becomes disengaged from the whole thickness of the springing wall; thus the weight of the abutment is in-



creased, the span of the arch is diminished, and the part of the wall above the arch does not hang ready to slide from off the back of the arch; this corbeled springing-work may be set in cement, or it may be made of stone).

Dry-areas. To construct round the building the dry-areas according to the drawings. [Dry-areas are made in two ways: either with their walls battering against the ground, and covered over with paving-stones, or with their walls nearly perpendicular, and arched over on the top; in all cases they should be well-drained and ventilated: if they are to be accessible they should be paved with brick or stone.]

Chimneys. (See p. 76).

Indents (if any.) (See p. 110).

Cuttings. (See p. 111).

Bedding, &c. (See p. 77).

Cement against basement-walls. (If the ground lie against any of the basement-walls, add the following):—

To coat the walls of the basement-story $\frac{3}{4}$ inch thick with patent asphalte.

Piers. To construct under all the sleepers of the timber-floors, for the support thereof, brick-piers 18 inches high, consisting each of one course of work $13\frac{1}{2}$ inches square, and three courses of work 9 inches square

(Note. If the flooring be much raised above the original level of the soil, the brick-piers will be required of greater height, in which case no rubbish or earth needs to be be filled in between them, as that would lead to useless additional expense.)

(Some persons lay wood-sleepers upon continuous walls, whereas floorings should have the least possible contact with the earth. If the situation be damp a piece of sheet-lead should be laid upon each pier to preserve the wood from rotting).

Brick-paving. To pave the whole of the cellars and the passages therewith connected, with the best paving-bricks, set

closely on edge in manner of herring-bone, in mortar, and grouted completely all over and between the joints with liquid mortar.

Tile-paving: Pave the entrance-hall, staircases, larder, office-passage, lobbies, and other floors (coloured pink on the plans) with Godwin's, Minton's, or Maw's thin impressed $4\frac{1}{4}$ inch square red, black, and buff tiles, with $1\frac{1}{2}$ inch slips and one-fifth of the quantity encaustic pattern tiles, one-third of the remaining quantity glazed tiles, to be laid and set in cement upon a thickness of 4 inches of concrete.

Pave the dairy, lobby, scullery, larder, and pantry, with 6 inch square red paving tiles, set and laid in mortar on 4 inch thickness of concrete. Pave the other offices with 12 inch red paving tiles, also on 4 inch thickness of concrete.

Drainage. (See p. 77).

Brick-facings. (See p. 76).

10 Rods extra brick-work. (See p. 78).

Bricks. (See p. 78).

Mortar. (See p. 78).

Mode of doing the work. (See p. 78).

Jobbing-work. (See p. 79).

MASON.

Stone-dressings. The whole of the window and doorway dressings, including heads, jambs, sills, and mullions, and also all strings, cornices, copings, cappings of chimneys, bell turrets and other work, indicated on the elevations with a yellow tint, to be of stone, free from all vents, shakes, or other defects, and all laid on its natural or quarry bed.

Dowels. All the joints of the copings of gutter and parapets and bell turret to be set with hard stone dowels 1 inch by $\frac{1}{2}$ inch to each stone.

The copings to gables to have springer, capping,

and bond stones worked on the solid, as shown on the elevations. Build in on the solid over the line of all roofs and gutters, where they abut against walls or chimneys, projecting, chamfered, and throated weather cornices.

Provide polished marble shafts to the principal doorway and the jambs of the staircase window, the joints being set in cement, with a layer of 4lb. lead to each joint.

Internal stone-work.

The arcade in hall, and the niches shown in the section, to be of stone, together with the heads of doorways shown to open out into the hall, to be executed according to the detail drawings.

Blocks for carver.

To leave blocks for the carver of the size shown on the detail drawings for the sculptured work. The carving is not to be included in the contract.

Ashlaring.

To face the fronts of the mansion with stone ashlaring, cut out in courses to suit in height four courses of the brick-work as far as possible varying the heights from 8 inches to 11 inches in the course; the whole of the ashlaring is to be formed in the manner and in the proportion of the Flemish bond of brick-work, that is, alternately, with headers $8\frac{1}{2}$ inches deep from the face of the work, and stretchers 4 inches deep from the face of the work, and twice the length of the headers; so that the average thickness of the ashlaring will be $5\frac{1}{2}$ inches, exclusive of the quoins, which are in no instance to show stone of less thickness than 12 inches.

Steps.

To construct a staircase leading down to the basement-story, with solid Yorkshire quarry-steps, scantling 13 inches by $6\frac{1}{2}$ inches, properly back-jointed and pinned into the brick-work.

Back staircase.

(See p. 243).

Principal staircase.

(See p. 243).

Landings.

To construct the landings according to the drawings, those to the Yorkshire stone-stairs of Yorkshire stone 4 inches thick, with the requisite risers also of Yorkshire stone, and those to the principal staircase of Portland stone 6 inches thick, with moulded

nosings and with joggled joints run with lead. All the landings are to be inserted in the walls 4 inches deep at the least, and such of them as only tail into the walls in the manner of steps are to be inserted in the walls full 9 inches.

Marble cold-bath. To construct the basin of the cold bath according to the drawings; to render the same completely waterproof by sufficient Dutch terras properly applied; and to line the whole of the basin with Italian white and blue veined marble one inch thick, rebated together, set in Dutch terras, and securely plugged and cramped with copper at all the joints therein; to put all round the basin a border of similar marble 12 inches wide, with a rounded and polished nosing; and to construct of similar polished marble the steps leading down into the cold bath.

(A cold bath may be fitted up in a much cheaper manner with galvanized iron, see p. 105.)

Dairy. To fit up the dairy as shown by the drawings, with a dresser or table round the same of inch Italian white and blue veined marble one inch thick, with a skirting round over the same of similar marble 6 inches high.

(Economy may be consulted by fitting up the dairy with thick smooth slate, which may be enamelled.)

Line the walls of the larder, dairy, and gentlemen's lavatory with glazed white tiles, plugged and set in cement.

Cellar doorways. To build in each of the cellar doorways three pieces of Portland stone 18 inches wide, 18 inches long, and 9 inches high, and to cut out for and let into two of the same, and run with lead to each of the doorways, the hinges, and to let into one of the other stones to each doorway the locking-box.

(The use of door-case of wood to cellars should be avoided.)

Hearths. To put to each of the fire-places throughout the buildings a back hearth of $2\frac{1}{2}$ inch rubbed Yorkshire stone.

Marble chimney-pieces.

To provide and fix in the dining-room a marble chimney-piece according to the drawings, in value 30 guineas, exclusive of the carriage and fixing, and to put thereto a slab of marble one inch thick, long, and 20 inches wide.

To provide and fix in the library a chimney-piece of Kilkenny marble, with a slab of similar marble full one inch thick, value together 25 guineas, exclusive of the carriage and fixing.

To provide and fix in the drawing-room a chimney-piece, according to the drawings, of the best, perfect, unblemished statuary marble, with a slab of similar marble full one inch thick, value together 60 guineas, exclusive of the carriage and fixing.

To provide and fix in the boudoir a chimney-piece, with a slab thereto, as described to the drawing-room, but in value 40 guineas, exclusive of the carriage and fixing.

To provide and fix in each of the best 4 bedrooms a chimney-piece, according to the drawings, of the best, perfect, and clear and handsomely veined Italian white and blue marble, with a slab of similar marble full one inch thick, in value together 25 guineas, exclusive of the carriage and fixing.

To provide and fix in each of the four dressing-rooms, and in each of the eight other superior chambers, a marble chimney-piece, according to the drawings, of white and blue veined marble, or of such other description of marble as may be chosen, and with a slab of similar marble full one inch thick, in value together to each chimney 8 guineas, exclusive of the carriage and fixing.

To provide and fix to the kitchen-chimney, jambs and mantle of 2 inch Portland stone 10 inches wide, and to put to the same chimney a slab of $2\frac{1}{2}$ inch rubbed Yorkshire stone.

To put in the butler's-room and housekeeper's-room Portland stone chimney-pieces, according to the drawings, and with slabs of 2 inch Portland stone 4 feet long and 1 foot 8 inches wide.

To put to all the other fire-places throughout the mansion and its offices, jambs, mantles and shelves of $1\frac{1}{4}$ inch Portland stone 6 inches wide, and slabs of 2 inch Portland stone long and 20 inches wide.

Holes, rebates, &c. (See p. 81).

Cleaning off work. (See p. 81).

Reparation of injury. To carefully protect the stone-work from injury, either from weather or violence, during the progress of the work, by casing, or other means; and to leave the whole of the work in a perfect state at the completion.

Carving. Provide the sum of £ for carving and sculpture.

SLATER.

Countess slates. (See p. 82).

Bond nails, &c. (See p. 82).

Reparation. (See p. 82).

To neatly cut the slates at all hips, and cover the hips with slate hipping, screwed and fastened. Cover the ridges with red tile ridges to pattern, perforated and cut top, set in cement.

CARPENTER AND JOINER.

Clerk's office. To provide, erect, and maintain during the time the works are being carried on, a temporary office for the clerk-of-the-works, with door, sashed window, wood floor, and all other fittings and appurtenances complete; and to provide and place in the same a stool and also a table to receive the drawings. (*Note.* If a chimney be required to this temporary building, a clause to that effect must be inserted in the bricklayer's work.)

New materials, &c. (See p. 82).

Timber and deals. (See p. 82).

Sundries. (See p. 82).

Centering. To provide, fix, ease when directed, and finally remove, centering and turning-pieces sufficient for all the gauged and rough arches and trimmers and for the groined vaultings and other vaultings of the cellars and of their passages, with all requisite struts, supports, wedges, and other proper and necessary appurtenances.

Casing to stonework, &c. To case up, from time to time, to prevent injury, the whole of the stonework during the progress of the works.

Wood-bricks. (See p. 97).

Lintels. (See p. 83).

		Ins.	Ins.
Ground floors.	Oak sleepers	5	by 3
	Fir joists	4½	2½
	1¼ inch right wainscot straight-joint floor to the library edge-nailed.		
	1¼ inch wrought clean, straight-joint yellow batten flooring, edge-nailed, to the remainder of the principal building.		
	1¼ inch clean deal wrought, straight-joint flooring of half boards, edge-nailed, to the remainder of the story.		
Other floors.	Wall-plates	5	4
	Girders	14	12
	Joists	10	2¼
	Trimmers and trimming-joists	10	2¾
	Cradling of inch yellow deal to the girders and other parts of to form the ceiling into panels and coffers, according to the drawings.		
	¼ inch wrought clean, straight-joint, yellow batten flooring, edge-nailed, to the principal building.		
	¼ inch clean deal-wrought, straight-joint flooring of half-boards, edge-nailed, to the servants' chambers and to the passages and lobbies thereto attached.		
Roof over the principal building.	Wall-plates...	6	6
	Angle-ties (each 6 feet long) and dragon-pieces	12	2½
	Pole-plate	5	4

	Ins.	Ins.
Purlins	7	by 5
Rafters	4	3
Hips and ridges	10	$1\frac{1}{2}$
Valley-pieces	10	6
10 Tie-beams	12	6
8 Return ditto	12	4
28 Principals, at bottom 7 ins. by 6 inches, at top	6	6
28 Queen-posts	8	6
10 Collar-beams	7	6
8 Return ditto	7	4
10 Straining-sills	$3\frac{1}{2}$	5
28 Struts	$3\frac{1}{2}$	6
Binders	9	4
Ceiling-joists, spiked in one length beneath the binders	3	2
Slate-battens	$2\frac{1}{2}$	1
Lear-boards	10	$0\frac{3}{4}$

Flats.

Wall-plates...	6	6
Joists	10	$2\frac{1}{2}$
Trimmers and trimming-joists	10	3

$1\frac{1}{4}$ inch yellow deal boarding for lead, listed free from sap-wood, laid with a current of $1\frac{1}{2}$ inch to every 10 feet lineal, and with $2\frac{1}{2}$ inch drips to the heading-joints of the lead, rolls to the longitudinal joints of the lead, and inch yellow deal risers not less than 4 ins. wide next the gutter.

Dormers.

The dormers to be executed according to the drawings, the whole of the timbers exposed to the weather to be of English oak, pinned together with oak pins, and carefully chosen heart-wood.

Gutters.

Lay the gutters with 1 inch gutter-boards and bearers to a fall of $1\frac{1}{2}$ inch in 10 feet, and 2 inch drips every 12 feet, and 12 inches wide at the narrowest part.

Battening.

To batten the external walls of the principal building with inch yellow deal $2\frac{1}{4}$ inches wide, not more than 12 inches apart.

(Battening is frequently requisite in order to prevent the internal finishings from being fed with

external damp, but it leads to expense and unsoundness, affords harbour for vermin, and increases the quantity of material which will burn and rot.)

Double walling. (See p. 280). (This if used should be in "Bricklayer."

Quartered-partitions. (See p. 85).

Skirtings. To fit up the several rooms of the principal building with yellow deal skirtings, according to the drawings, having inch plinths, ploughed grounds, backings, and all other proper work and appurtenances.

To fit up all the office-buildings with inch yellow deal square skirtings 8 inches high, plugged to the walls.

Windows. To put to the best $2\frac{1}{2}$ inch moulded and handsome Spanish mahogany French casements, French polished on the inside, hung each with 4 pairs of 4 inch brass butt-hinges, fixed by gilt-headed screws, in French polished oak frames 6 inches by 5 inches, with oak double-sunk sills 5 inches by 5 inches, with brass filleting fixed by copper screws; and to put to the casements fastenings value . (A particular description of the fastenings may be given).

(All French casements are apt to admit the rain; to prevent this there are several inventions, but most of them are subject to easy derangement; but if the casements are in situations where they can open outwardly, this inconvenience can be in a great measure prevented.)

Mahogany sashes, &c. To fit up all the windows of the dining-room, drawing-room, library, and boudoir, with the very best $2\frac{1}{2}$ inch Spanish mahogany moulded sashes, French polished on the inside thereof, and double hung with the best large patent lines, brass axle-pulleys, iron weights, and patent spring fastenings, in deal cased-frames with oak double sunk sills, $1\frac{1}{4}$ inch best Spanish mahogany pulley-stiles and the best Spanish mahogany sash-beads, the stiles and the beads French polished, and fixed with gilt-headed screws in brass sockets.

Wainscot sashes, &c. To fit up the best four chambers and the five dressing-rooms with windows the same as those last described, but with the sashes. pulley-stiles, and sash-beads, of the very best right wainscot French polished.

Deal sashes.

To fit up the remainder of the principal buildings with windows the same as those last described, but with 2 inch yellow deal moulded sashes, $1\frac{1}{4}$ inch yellow deal pulley-stiles, and deal sash-beads, except the mullioned windows, which are to have $1\frac{1}{4}$ inch oak casements, hung with strong iron butts, approved fastenings, and stay-bars.

Boxed shutters.

To fit up all the windows of the ground-floor (except) with $1\frac{1}{2}$ inch shutters, prepared and hung in two heights, in $1\frac{1}{2}$ inch proper boxings, sunk, rebated, and beaded; all the front shutters are to be framed to correspond with the doors of the rooms and other places in which they are placed; the backs of the shutters of the office-buildings are to be framed square, and all the backs of all the other shutters are to be framed bead-flush.

To put to all the boxed shutters, handsome knobs to pattern, and spring shutter-bars.

To put to all the windows, $1\frac{1}{4}$ inch bead-flush back-linings, and $1\frac{1}{4}$ inch deal backs, elbows, and soffits, framed to correspond with the front shutters, and with beaded cappings and elbow-caps.

Internal shutters without boxings.

The kitchen and servants'-hall to have $1\frac{1}{2}$ inch square panel shutters, hung to fold back against the wall without boxings, with proper knobs and spring shutter-bar.

Doors.

To fit up the dining-room, drawing-room, library boudoir, and entrance-hall, with the best handsomely figured $2\frac{1}{2}$ inch Spanish mahogany French polished double-margined doors, moulded on both sides, according to the drawings, and hung with the best 4 inch brass butt-hinges, with tempered steel-plates in the hinge-knuckles, and fixed with gilt-headed screws, and with the very best, strong, well made mortise-locks, with handsome brass furniture to pattern. The outer doors of the entrance-hall are to have sashes therein, and ironmongery in addition to the locks and hinges of the value of 20*s*.

To fit up the best four chambers, the five dressing-rooms, and the side entrance-lobby, with doors in all respects as those last described, except that they are to be of the very best wainscot French polished.

To fit up the remainder of the doorways of the principal building with doors in all respects as those last described, except that they are to be of deal.

To fit up all the cellars with 2 inch oak four-panel doors, framed bead-butt on both sides, and hung each with a pair of strong hook-and-eye hinges and a 9 inch best copper-warded lock with two keys thereto.

To fit up all the doorways of the office-buildings with 2 inch deal four-panel doors, hung with $3\frac{1}{2}$ inch butt-hinges, and with a best strong 7 inch iron-rimmed lock, with three bolts, and with strong plain brass furniture to each, except to the outer doorways which are to be framed, bead-flush on the outside, to be hung each with three 4 inch butt-hinges, a 10 inch draw-back lock with strong brass furniture, two wrought-iron dogs with sockets, and two 12 inch bright barrel-bolts.

Closet doors. To put all the closets $1\frac{1}{2}$ inch deal doors, framed to correspond with the doors of the respective rooms and other places in which the same are to be placed, and hung with $3\frac{1}{2}$ inch butt-hinges and a patent tumbler lock with brass escutcheon to each.

Door-cases. To put to all the outer-doors, oak proper door-cases 6 inches by 5 inches, tenoned with slab tenons into the steps.

Door-linings. To fit up all the doorways with $1\frac{1}{4}$ inch double rebated linings, framed, each set in three panels to correspond with the respective doors intended to be hung therein.

Grounds. To put round on both sides of each doorway inch deal framed and ploughed grounds $4\frac{1}{4}$ inches wide, with six dove-tailed braces of inch deal 4 inches wide to each doorway.

Architraves. To finish the doorways of the office-buildings with mouldings laid upon the grounds; and to finish all the other doorways with moulded architraves, according to the drawings.

To lay upon the boxings of the shutters mouldings to correspond with those to the architraves of the doors.

Principal staircase (if of wood).

To construct the principal staircase according to the drawings, with landings, treads, and risers of the very best $1\frac{1}{4}$ inch right Dutch wainscot, tongued, and with moulded returned nosings, on strong bracketed carriages, $1\frac{1}{2}$ inch wainscot moulded, beaded, cut and mitred string-board, with carved brackets thereon, $1\frac{1}{4}$ inch wainscot wall-string, $1\frac{1}{4}$ inch wainscot apron-linings to correspond with the string-board, framed, turned, and carved balusters and newels of wainscot, and large wainscot moulded hand-rail, with scroll to the curtail-step.

Mahogany hand-rail.

To put to the stone principal staircase (*if any*) a large complete hand-rail of the best handsomely figured solid Spanish mahogany, with ramps, scroll, and other proper curvatures, grooved in order to receive the iron-work, and securely fixed together with proper heading-joints and screws.

Back staircase (if of wood).

To construct the back staircase according to the drawings.

Best water-closets.

(See p. 102).

Common water-closets.

(See p. 102).

Privies.

(See p. 126).

Bath top and casing.

To fit up the warm bath with the very best handsomely figured inch Spanish mahogany riser, frame, and clamped flap, fixed with all requisite bearers and other proper fittings and appurtenances, the flap is to be moulded in front, and is to be hung with four 3 inch strong brass butt-hinges, and the riser is to be paneled and moulded, according to the drawings.

Cistern.

(See p. 126 if of lead).

Sinks.

(See p. 81).

Butler's sink.

(See p. 259).

Pipe-casings, &c.

(See p. 292).

Dressers.

To provide and fix in the kitchen a dresser, with cross-tongued top of 2 inch clean deal 10 feet long and 2 feet 9 inches wide, supported on strong framed

legs and bearers; inch deal pot-board on strong bearers; six sunk shelves of $1\frac{1}{4}$ inch deal 7 inches average width; inch deal wrought, beaded, grooved, and cross-tongued back behind the shelves; four shaped standards of $1\frac{1}{4}$ inch deal; inch deal top 14 inches wide, with moulded cornice thereto; five drawers with bottoms and dove-tailed rims of $\frac{3}{4}$ inch deal, fronts of inch deal beaded, two strong brass drop handles, and a good patent tumbler-lock to each drawer; and slides, runners, bearers, and all other proper and necessary work and appurtenances complete.

To put in the scullery a dresser-top of $1\frac{1}{2}$ inch clean deal 2 feet 6 inches wide and 6 feet long, cross-tongued, and fixed upon strong wrought and framed legs and bearers.

Plate-rack. To provide and fix in the scullery a strong plate-rack of wainscot complete, feet inches wide, feet inches high, and inches deep.

Fittings in the larder. (See p. 330).

Other fittings. (See p. 330).

£50 extra fittings. (See p. 331).

200 cubic feet fir extra. (See p. 89).

Jobbing-work. (See p. 103).

SMITH.

Chimney-bars. To provide and fix to the kitchen-chimney two wrought-iron cradle-bars, each 2 inches by $\frac{3}{4}$ inch, and in length extending quite through to the outsides of the chimney jambs, and corked at each end; and to put to each of the other fire-places of the buildings a wrought-iron chimney-bar 3 inches by $\frac{1}{2}$ inch.

Air gratings. To provide and fix in the brick-work thirty air gratings of cast-iron with frame-work according to the drawings.

Grates and Ranges. To provide and set to the best rooms, grates,

value, each	£6	0	0
,, ,, bed-room	4	10	0
,, other bed-rooms and attics	1	0	0

To provide and set to the nursery, a range		2	10	0
„ „ kitchen, „		15	0	0
„ „ scullery, „		5	0	0

Balusters, &c., to staircase.

To provide and fix to the back staircase and to the landings thereof (*if of stone*) wrought-iron balusters $\frac{3}{4}$ inch square, turned wrought-iron newel equal to $1\frac{1}{2}$ inch diameter, and rounded hand-rail of wrought-iron $1\frac{1}{2}$ inch, by $\frac{1}{2}$ inch the balusters and newel riveted at top into the hand-rail and let at bottom into the stone-work and run thereinto with lead.

To provide and fix to the principal staircase, and to the landings thereof (*if of stone*), ornamental wrought-iron balusters and newels, according to the drawings, and top-rail of wrought-iron $1\frac{1}{4}$ inch by $\frac{1}{2}$ inch to be let into and to be securely screwed to the mahogany hand-rail; and the balusters and newels riveted at top with copper into the iron-rail and let at bottom into the stone-work and run thereinto with lead.

PLASTERER.

L. P. F. and set.

To lath, plaster, float, and set ceilings and strings (to the wooden staircase if any) to the whole of the mansion and the offices thereof, and the quartered-partitions of the servants' chambers.

Stucco.

To execute all the remainder of the sides of the whole of the interior of the mansion and of its offices, with the very best floated stucco, lathed where requisite; the stucco of the office-buildings is to be finished with rough surfaces, and all the other stucco is to be troweled quite smooth.

Arched work, groins, panels, &c.

To execute all the arched and panelled ceilings, bands, architraves, panels, and coffered-work, according to the drawings, in the best and most accurate manner in gauged-stuff.

Cornices, enrichments, &c.

To run plaster cornices round the several rooms and other parts of the buildings, according to the drawings, and to put thereto the several enrichments accurately modelled.

To put in No. centre flowers, modelled according to the drawings.

Cement skirtings. To execute round the basement-story and round the ground-story of the office-buildings skirtings of Portland cement 10 inches high $1\frac{1}{4}$ inch thick, and whitened while yet soft, and when dry tinted stone colour.

Sundries. To execute all requisite beads, quirks, and arrises; to stucco all the internal reveals; to perform all requisite dubbing out; to find all needful additional projections and thicknesses; and to counter-lath the work all over any large timbers, and where else may be requisite.

All the requisite lathing is to be done with lath-and-half heart of fir laths free from sap-wood; all the enrichments are to be carefully finished or trimmed; all the principal leaves and other heavy embossed work are to be secured by strong copper screws; and all the mouldings are to be run with copper moulds.

Whiting. To whiten all the ceilings of the office-buildings.

Colouring. To colour of such tints as may be directed the plastering to the sides of the offices.

Lime-whiting. To stop and lime-whiten twice all the internal unplastered brick-work of the offices and cellars.

PLUMBER.

7lb. lead gutters and valleys. (See p. 259).

7lb. cast-lead flats. (See p. 259).

5lb. milled-lead flashings 6 inches wide. (See p. 259).

Eaves'-guttering of cast-iron. (See p. 209).

Square Rain-water-pipes. To provide and fix on the front and of the mansion, square cast-iron rain-water-pipes 5 inches bore, and securely fixed, with ornamental and moulded heads, with 2 inch strong overflow discharging pipes.

Round rain-water-pipes. To provide and fix to the office-buildings stacks of cast-iron rain-water-pipes 4 inches bore, with large heads and shoes complete.

Water-closets. (See p. 105).

Cisterns. (See p. 105).

Housemaid's and butler's sink. (See pp. 81, 259).

Pumps (if any). (See p. 317).

Cold water. To lay on the water to the cold-bath-room with sufficient strong lead $1\frac{1}{4}$ inch pipe, with a brass cock thereto; and to put to the bath a $2\frac{1}{2}$ inch strong lead water-pipe, with a brass washer and a plug thereto.

Hot water. Provide the sum of £ for hot water service complete, with piping from the kitchen-range. (See also pp. 105 and 106).

Roses in gutters. To provide and place in each rain-water cess-pool a hemispherical rose of 10lb. lead, 6 inches diameter, pierced with holes.

Copper nails. All the nails to be used in the lead-work are to be of copper.

GLAZIER.

British plate glass. To glaze the whole of the windows and lights of the dining-room, withdrawing-room, library, boudoir, entrance-hall, and of the best four bed-rooms, and of the five dressing-rooms, with the best clean and strong British plate-glass bedded in putty and secured by mitred mouldings of French-polished Spanish mahogany, fixed by gilt-headed screws.

Stained glass. To provide the sum of £ for stained glass in the staircase and lobby windows, fixed complete.

Best Newcastle glass. To glaze all the remainder of the windows and lights throughout the buildings with the very best clear Newcastle crown glass, properly bedded, bradded, and back-puttied.

Cleaning, &c. The whole of the glazing is to be cleaned and left perfect immediately before the final rendering up of the buildings as complete.

PAINTER.

Preparation. (See p. 164).

4 times in oil to iron-work. (See p. 165).

4 times in oil to wood-work. (See p. 165).

Flatting. (See p. 165).

Varnishing. (See p. 165).

Distemper. To colour in distemper in the very best manner the ceilings, cornices, centre flowers, beams, arches, coffered-work, and enrichments of the whole of the mansion, except such of the plasterer's work as is hereinbefore directed, to be whited, or coloured, or painted.

CHAPTER XVIII.

SPECIFICATION *of the works required to be done in erecting a* VILLA RESIDENCE *for , at , in the county of , from the designs, and under the superintendence of , architect,* .

EXCAVATOR.

Vegetable soil. The whole of the vegetable soil to be removed to where directed upon the estate from the whole area of terrace shown on plan.

Trenches. The several trenches for the reception of the concrete footings to be formed the depths and widths figured upon the drawings, or to any greater depths that may be necessary to form a good and solid foundation.

Terraces. The surplus earth to be deposited so as to form the terraces shown on drawings; for this purpose, also, the earth that has been carted on to the site is to be used; the slopes to be carefully trimmed, and the whole left ready for turfing.

Drains. The trenches for the several drains to be formed in the direction shown on the plans. The rain-water-drains in all cases to be carried above the level of the foul drains, where they cross each other; the rain-water-drains are all to lead to the rain-water-tank shown on the plans.

Ram. The footings to all walls to be filled round solid and rammed, previously to the walls being brought up.

All the surfaces of the made ground to be well rammed, especially round the foundations of walls, and under the concrete footings and floors throughout.

Concrete. (See p. 75).

Concrete floor. A concrete floor to be formed for the beer and wine cellars, 6 inches thick, well beaten down and smoothed at top.

Brick samples. (See p. 78).

BRICKLAYER.

Mortar. The mortar is to be made from Dorking or Merstham lime and good sharp river sand, in the proportion of two of lime to three of sand, mixed in a pug mill. The cement to be from approved manufacturers, and of the best kinds; and in all cases, unless described as neat, to be mixed in equal proportions with clean washed sand.

Facers above basement. The outside walls to be built hollow, and the face-bricks above the level of finished ground line, and where the face shows in the inside, to be purpose made, each brick being 2 inches high by 10 inches by 5 inches, and the mortar-bed two-fifths of an inch, there will be 5 courses to a foot, all the facers being laid stretchers, and great care to be taken to break joint equally; the inside wall, and all other brick-walling throughout, to

Hollow walls. be built of good strong stock-bricks, laid 4 courses to a foot, and the inside and outside walls to be tied together with galvanized iron ties at every foot in height, the ties being 18 inches apart.

Basement do. The outside walls of basement below the finished ground line to be built of strong approved stock-bricks, hollow, and the two walls tied together in a similar manner to those above.

Quality of facers. The facing-bricks to be red, of a chosen tint, and to be made by of or other approved makers; and specimens of the kind proposed to be used to be forwarded by each contractor with his tender.

Moulded bricks. The whole of the window jambs, beads, enriched cornices, strings, chimney-heads, arches, plinths, friezes, and other ornamentation shown upon the elevations, to be executed in moulded brick, working in with the courses of the plain face, and to be of exactly similar colour and texture, and, if possible, manufactured by the same makers as the facers.

Terra cotta shafts. The circular arcade, caps, bases, and shafts over bay windows and porch, and at level of first-floor windows, to be executed in terra cotta, by or other approved maker, and to be of the same colour as the facing-bricks, and to be set in cement. The caps to columns of portico also to be of terra cotta.

Areas. Form the circular areas and foundation walls for steps as shown on basement plan; the outside face of these areas, and all walls filled against with earth, to be coated with patent asphalte to keep out the damp.

Asphalte to basement.

Damp-course. Lay in cement at the ground-level a double slate damp-course, to prevent the damp from rising.

Air Bricks. Form under each of the windows in exterior walls in each floor openings for air-bricks, 10 inches by 2 inches; these to open under the floors for ventilation.

Brick vaulting. Vault over the basement-passage, where shown in section, with $4\frac{1}{2}$ inch brick arch, in cement, and $4\frac{1}{2}$ inch rings under; the wine and beer-cellar, and coals and back passage, to be arched over in $4\frac{1}{2}$ inch brick-work in cement.

Vault over the inside of porch in rubbed and gauged brick-work in cement, and form cornice as shown.

Outside facing. The outside facing is to be kept clean with great care, and the joints finished with a neat flat joint in fine mortar.

Chimney-bars. All chimney-openings to be fitted with chimney-bars, $2\frac{1}{2}$ inches by $\frac{1}{2}$ inch, having 9 inch bearings and double cuttings. Cement bond to be formed at the level of each floor, to be in three courses, and built into the inside thickness of outer walls. And one tier of hoop-bond of one inch by one-tenth inch iron, tarred and sanded, lapped at all joints and angles, to be laid in the cement-bond, 2 lines in a course.

Flues. Form all flues where shown, 14 inches by 9 inches, pargetted and cored, and carried down to the level of the chimney-bars; all fire-places above the basement to be fitted with turning arches in half-brick, in cement, 18 inches wide, and the length of the hearth; and to have a proper skewback in the wall springing.

Air-grating. Each fire-place on the upper floors to have an air-grating in the front hearth communicating with the air-brick under the windows for a local supply of air to the same.

Set stoves and ranges.

Set all stoves and ranges to the several fire-places, with all necessary bricks, clay, &c.

Sleeper walls.

The wood floor on the basement to have sleeper walls formed in half-brick, with 1 inch brick footings, and 15 inches high; and this space to be preserved under all the wood floors of basement, and openings to be left in the sleeper walls to admit of a passage of air between them, and to connect with gratings in the areas. The fire-places of these walls to have fender-walls fitted all round for hearths in the same manner.

Bed plates, &c.

Bed all plates, sleepers, lintels, templates, &c., in mortar; and all window and door-frames are to be bedded in lime-and-hair, and neatly pointed at the same time.

Chimney-shafts.

The 5 top courses of chimney-shafts to be built in cement in all cases.

Form a coal-shoot at side of porch, with stone top and cast-iron plate properly fastened.

Rain-water-tank.

Form a rain-water-tank where shown, with a bottom of 2 courses in cement, and sides 1 brick in cement, and diameter 4 feet 6 inches, height 4 feet 6 inches, to be domed over with stone man-hole on top, 2 feet diameter, fitted with ring. The inside, bottom, and face, to be rendered in neat cement, $\frac{1}{2}$ inch thick. The rain-water to be conveyed to the tank with 4 inch glazed earthenware pipes, and inserted into the same, with all necessary bends and junctions set in cement, and laid with a fall of 1 inch in 10 feet. An overflow to be formed with 4 inch pipes, as before, into the foul-water-drain, and to be properly trapped and laid so as to insure no backward current. The down iron pipes are to dip into the orifice of the 4 inch glazed bend, the joint being stopped in cement. In all cases the junction to be under the surface.

Drains.

The foul-water and soil-drains are to be carried in the manner shown, with 4 inch, 6 inch, and 9 inch earthenware socket-pipes, as described, set in cement, with all necessary bends and junctions; traps to prevent the return of effluvia to be inserted wherever necessary and directed. (See also p. 77).

Chaces. Chaces for the insertion of pipes in the walls to be formed wherever shown or may be deemed necessary.

Brick-coring. The bricklayer is to provide and build all necessary brick-coring for the cement columns in hall, vestibule, gallery, and drawing-room; and for all ceilings, skirtings, or wherever required.

Generally. The bricklayer is generally to attend upon all other tradesmen: he is to cut away for and make good after all other workmen; he is to bed all plates and frames for the carpenter and joiner, bed all templates for girders, bearers, &c.; bore all holes for plumbers, engineers, bell-hangers, &c. He is to point round all plumber's work where it joins the brick-work; set all stoves, ranges, coppers, and make good after smith; to see that all drains and pipes are clean, and that all rubbish is removed at completion of the works. All the brick-work generally to be overlooked at completion; all loose and spring joints to be made good; all defective bricks cut out and replaced; all brick-dust brushed from face-work; and any defective portions of the rubbed or moulded work is to be made perfect in every part.

Provide all requisite and sufficient scaffolding, braces, and struts, with all boards, ledgers, poles, put-logs, cords, ladders, and all other requisite materials.

Tile-pavement. Pave the hall and vestibule, where coloured pink upon plans, with Minton or Maw's $4\frac{1}{4}$ inch thin impressed red, chocolate, buff and black impressed tiles, a proportion of one-tenth to be encaustic tiles, and the borders to be formed in 3 inch and 2 inch slips; the whole to be laid and jointed in cement, upon the fine concrete before specified, which is to fill in the haunches of the arches.

Tile-lining. Line the walls of water-closet and lobbies on the ground-floor and first-floor with white 6 inch Dutch tiles, to 5 feet above the floor level; all to be set in cement and fixed a neat joint.

Niches. The niche on either side of the front doorway to be worked circular on plan, in cut and rubbed brick-work, and covered over; and the whole worked in the most careful and workmanlike manner.

Copings, and in cement.

The copings, balusters, and piers forming balustrade over porch and bay windows, to be entirely set in cement.

Provide and set in scullery a 40 gallon copper with proper flues, furnace, furnace-bars and door and lid complete.

MASON.

Portland stone.

Provide, work, and set in the best manner, with stone of the best quality, the several parts of the building required to be in stone. Portland to be from the Waycroft Quarries, weatherstone, not too fresh quarried, and free from vents, shakes, and all other defects, and to be set on its proper bed.

Sills.

Portland weathered and throated sills, as shown, to the ground-floor and basement-windows, of the sizes shown in the detail drawings.

Steps to porch, &c.

Marble mosaic floor.

The porch steps, and the steps up from terrace to breakfast-room to be of rubbed Portland. The floor of porch to be formed of Italian marble mosaic laid by Burke or other approved manufacturer and to be of the pattern shown upon the plans to be laid upon a 6 inch thickness of concrete rendered on top in cement. The steps of porch, and breakfast-room, and front entrance, to have $2\frac{1}{2}$ inch rounded and chamfered treads and 3 inch risers where shown. The rest of risers to be filled with thick rough plate glass, let into rebate, and set in cement.

Area steps.

The area steps down to basement level to be formed of 3 inch treads and $1\frac{1}{2}$ inch risers, built into main and retaining walls, as shown, $4\frac{1}{2}$ inches each side.

York sills.

Put to back-door, and door into coals, wine and beer, 3 inch rubbed York sills, the back door sill being raised one inch above the area level.

Basement-paving.

Pave the basement and areas where coloured blue, except the wine and beer cellar, with 2 inch rubbed York stone, properly squared and pointed, to be laid and jointed in cement upon a 6 inch thickness of concrete.

Servants'-stairs. 3 inch rubbed Yorkshire stone treads and risers, with landings to the servants'-stairs from basement to hall; rubbed Yorkshire stone steps with 4 inch landings from ground-floor to attic-floor, with splayed soffits properly back-jointed pressed into the walls 5 inches.

Best stairs. The best staircase to have picked Portland stone steps, with moulded nosings and returns, and shaped soffits properly back jointed and securely pressed into the walls at the ends in cement, and mortised, as may be directed, to receive the iron balusters. $4\frac{1}{2}$ inch picked Portland stone landings, moulded to accord with the steps, sunk, and left rough on the underside to receive wrought-iron bearing-bars and plaster soffit, to be securely tailed and pressed into walls 9 inches in cement. Protect during the progress of the works the several heads and nosings of the staircases by slate or tiles bedded thereon.

Area copings. Put $2\frac{1}{2}$ inch Portland coping, 12 inches wide, throated and weathered to area walls, set in cement, and the joints run with lead.

Templates. Provide all requisite templates and corbels of rough York stone, for the ends of iron girders, or bearing-beams, or partitions.

Sink. Provide, and fix upon brick piers, a York stone sink, 5 feet long by 2 feet 6 inches wide, and 5 inches deep inside, net measure; have a brass bell grate and 3 inch waste to drains. (See also p. 81).

Hearths. Put to all fire-places $1\frac{1}{2}$ inch rubbed York front and back hearths, of the sizes shown, except kitchen and scullery, which are to be $2\frac{1}{2}$ inch back and front hearths. (Or tile hearths in which describe to be laid upon concrete and set in cement).

Fire-places. Put to kitchen and scullery fire-places $2\frac{1}{2}$ inch York chimney-pieces, with 9 inch jambs and heads, and 2 inch mantels, 9 inches wide, corners rounded.

Put to servants'-hall, butler's-room, and nursery, and play-room, rubbed 2 inch Portland fire-places with 8 inch jambs, segmental arched head 10 inches wide, 2 inch mantel 9 inches wide, and rounded corners, and chamfer round the opening.

		£	s.	d.	
Provide for	drawing-room fire-place the sum of	40	0	0	and fixing
„	dining-room ...	40	0	0	„
„	breakfast room...	30	0	0	„
„	study	30	0	0	„
„	school-room ...	10	0	0	„
„	3 best bed-rooms	10	0	0	each „
„	1 dressing-room	10	0	0	„ „
„	2 do. and bath	5	0	0	„ „
„	5 attics... ...	0	10	0	„ „

Columns. The four columns outside porch to be of red Mansfield stone, circular and diminishing, and worked up to a face with fine grit.

Insert 4 Portland stone carved corbels under landing in staircase-window, as shown in east elevation.

Clean off. Clean off prior to the completion the whole of mason's work, and point up all defective joints. Rectify any damage that may occur during the works. Cover up stone plinths, steps, or elsewhere, that may be thought requisite.

CARPENTER AND JOINER.

Materials. The whole of the fir timber is to be of the best sound Memel or Dantzic, free from sap, shakes, dead knots, or other defects. The deals to be the best quality seasoned Christiana, free from all defects.

Generally. Provide all necessary timbers for stays, struts, ties, shores scaffolding pieces or other purposes that may be required, and for all sufficient centering for arches, turning pieces, rules, templets, moulds, levels, or other things required in the execution of the contract.

Roofs and Floors. Frame and fix in the most workmanlike manner the roofs and several floors of joists properly trussed or trimmed, of the scantlings marked and otherwise, in strict conformity with the several drawings, and with such further instructions as shall be given. Cover the whole of the roofs with $\frac{3}{4}$ inch yellow deal rough boarding for slating, putting $\frac{3}{4}$ inch deal bar boarding and tilling fillets where requisite. Put $2\frac{1}{2}$ inch deal rolls to all ridges. Lay inch yellow deal wrought boarding to all the gutters and flats upon proper fir

bearers forming 1½ inch rebated drips, 2 inch rounded rolls to the flats, not more than 2 feet 6 inches apart, and proper large cess-pools at pipe-heads. The gutters and flats not to have less fall, if possible, than 2 inches in 10 feet.

Flues.

Note.—No timbers to be nearer than 12 inches to any flue, and no rafters, quarters, or joists, to be a greater distance apart than 12 inches.

Roofs.

Frame the roof as shown on section with principals 7 by 5 inches, where shown on roof plan these principals to be screwed up from collar at level of ceiling, and to carry the purlins, which are to be framed. The head-pieces also to be framed in a similar manner; the purlins in the inside of the square to be deeper, and to have cast-iron rebated casements inserted in them, glazed, to give light and ventilation to the attics. The space between the purlins and wall-plates to have ceiling rafters nailed on, so as to form a double chamber, felt being nailed upon the strips, as shown in section.

Wall-plates.

The outside and inside wall-plates to be fastened together every 5 feet, by a cross piece of the same scantling, dove-tailed, cut and spiked on to them.

Skylight.

The framing for skylight over the vestibule to be executed as shown on the plan of roofs and section, each piece of glass to be of the size of the spandril, and strips to be screwed on the back of the rafters, against which the pieces will be cemented, and lead flashing rolled over.

Roof-trap.

Trim, and form an inside and outside trap, for entrance on to roof over staircase to nursery. Quarters to be 4 inches by 4 inches, the curb piece to be raised 4 inches above the level of slates, the trap-door to be framed and covered with 1¼ inch boarding, and securely fastened with long bolts from inside. This door to be hung with one pair 5 inch wrought butts.

Joists.

Lay the joists to the several scantlings marked. All trimmers for openings of flues and across openings to be ½ inch wider than the joists. The plates throughout to be halved at the angles, and the joists to be notched on the plates and to be 12 inches longer than their bearing.

Pugging. The floors of the ground-story, where not arched below the first floor and attics, to be sound boarded with lime-and-hair pugging; also the floor of water-closet. The joists under lead flats and other short bearings are to have timbers of sufficient scantling, with trimmers, as shall be directed during the progress of the works.

Lintels. Put lintels over all door and window-openings, the scantlings to be 1 inch deep for every foot of bearing and the full width of the wall above, and to be splayed at the ends, to spring the arches from the brick-work.

Bond-timber. No bond-timber or other wood-work to be laid into the walls, except where necessary for fixing the joiner's work, and no plugs to be driven nearer than 6 inches to any flue.

Partitions. The 5 inch partition to have the heads, sills, posts, and braces 5 inches by 4 inches, filling-in pieces 5 in. by 2 inches. The 4 inch ditto to have sills, posts, and braces 4 inches by 4 inches, filling-in pieces 4 inches by 2 inches. The ends of partitions in all cases to bear upon strong York corbels or templets.

Strutting: Insert two rows of herring-bone strutting and $\frac{3}{4}$ inch tie-rods, with all necessary screws, nuts, heads, and washers, to each room on ground-floor, and in proportion to rooms in other floors.

Skylights. Properly trim for and fix in roof the skylights indicated on the roof plan to be formed with double frames; the outside sashes to be fixed, and the inside sash to be hung with butts; the casing between double skylights to be pierced with holes at intervals.

The walls carried over bays of dining and drawing-room, and best bed-room, to be carried on girders, each 12 inches by 10 inches, sawn, reversed, and bolted with $\frac{3}{4}$ inch bolts, No. 6, to each, with nuts, screws, &c. complete, and a cast-iron flitch, 10 inches by 1 inch, between the girders, to be each 19 feet long, and to rest at both ends upon York stone templates 6 inches thick by 12 inches by 18 inches.

Generally. Provide and fix beads, stops, fillets, tilting fillets, backings, blocks, linings, casings, facings, bearers, bar boarding, &c., and perform all such rebating, groov-

ing, tenoning, scribing, housing, mortising, framing, mitring, dove-tailing, planing, and other labours connected therewith, as may be found necessary for a perfect performance of the carpenter's and joiner's work.

Floors.

Lay in the basement-rooms described to be boarded, and in attics and water-closets, $1\frac{1}{4}$ inch yellow deal floors, free from knots, and well seasoned, laid folding. Put $1\frac{1}{4}$ inch yellow deal clean picked battens, in 5 inch widths, free from all knots and well seasoned, laid straight joint with splayed headlings, and edges nailed to ground-floor, and first-floor rooms; the very best stuff to be used for these floors; and if one joint opens more than one thirty-second of an inch, the whole must be taken up and relaid.

Double ceiling.

Form a double ceiling over the kitchen, closets, and part of butler's rooms where indicated on plan, the vestibule floor above will be carried upon arches, as sketch, and the ceiling underneath is to be formed for the purpose of casing pipes for warming the vestibule and hall.

Skylight.

Case the beams shown on attic-floor supporting the central skylights, and form arcade, as shown in section. The pilasters to be formed of 1 inch deal, with mitred and cross-tongued angles, simply moulded caps, and bases, and semi-circular heads with moulded string, as shown: case the girders as sketch, and leave the whole complete.

Basement-window fittings.

Put to the windows of kitchen, servants'-hall, play-room, windows in passage under breakfast-room and scullery, 2 inch ovolo sashes, double hung with brass axle fittings, best patent lines and spring fastenings, in deal cased frames with oak sunk and weathered sills. (*Note.*—The whole of the windows in basement to have cement jambs. See Plasterer). The windows in larder, water-closet, back-stairs lights, and light to cellar-passage, to have 2 inch sashes hung as before, except that only one light of the windows next back-stairs are to open, the other two are to be fixed. Put in butler's and plate-room, cook's-closet and play-room-closet, 2 inch fixed deal ovolo sash; fit the larder and cook's-closet windows with perforated zinc, and glaze the butler's and plate-room and scullery windows, and windows under breakfast-room, with Hartley's patent glass $\frac{1}{8}$ inch thick.

Ground and first-floor sashes.

Put to all the windows of ground and first-floor Honduras mahogany sashes with mahogany beads, hanging stile with proper oak sunk and weathered sills, double hung with copper-wire rope, lead weights, large brass axle pulleys, spring fastenings, and thumb lifts; fit up jambs and soffits with mahogany jamb-linings on ground-floor, and all beading and framings showing inside with Honduras mahogany, to match the sashes. The first-floor windows to have the sashes only of mahogany, with deal cased frames and oak sunk and weathered sills. The division of sash-bars is shown on the elevations, and to be of copper, drawn with a rebate for glazing.

The windows of breakfast-room to be circular on plan, as shown; the upper part of centre window to be fixed, and the lower half to open with folding casements and moulded, as shown, for sashes with hook-joints, rebated and tongued stiles, and moulded fillet to meeting-stiles, moulded and throated water-fillet to bottom rails out of $1\frac{1}{4}$ inch by 3 inches, and fitted with Smith's patent casement fastenings and water-bar, and hung with 3 inch brass butts to wrought framed and rebated and beaded frames 4 inches by 3 inches, grooved for tongue of stiles with stopped hollow on outer arms, oak wrought and framed sill $2\frac{1}{2}$ inches by 2 inches.

Shutters.

The whole of the windows in rooms of ground-floor to have Clark's or other approved patent self-coiling mahogany shutters (No. 7). The coil will be placed in the head, as shown in detail drawing except to the breakfast-room, where the coil will be placed in boxing at right hand of window, as shown on plan; the soffits in all cases to be screwed, so that the shutter-coil may be reached for repairs.

The water-closet windows on ground-floor to have a fixed outer sash similar to other ground-floor windows, and inside $1\frac{1}{2}$ inch sash, flush with water-closet wall, glazed with Hartley's patent glass $\frac{1}{8}$ inch thick. The upper part of water-closet partition to be glazed the width of water-closet, and three feet high.

Fanlights.

The fanlights over the front doorway and the flanking archways to have copper sash-bars of the shape shown, as specified for best windows.

Fixed $1\frac{1}{2}$ inch sashes to be inserted in wall between back-stairs-landing and serving-room, 2 inches from floor and the whole height to landing.

Insert $1\frac{1}{2}$ inch fixed ovolo sashes to light lavatory and water-closet on first-floor, 4 feet above floor-line and five feet high.

Put a plate-rack in scullery, firmly fixed, 4 feet wide and 3 feet 6 inches high.

Cellar-doors. Put to the wine, beer, and coal-cellars, inch deal ledged and braced doors, hung with 24 inch cross garnets to proper door-frames, rebated and beaded, and tenoned into stone paving, and proper lock for each, value *5s.* p. c.

Basement-doors. Put to all other doors in basement $2\frac{1}{2}$ inch four-panel bead and butt and square-framed doors, with $1\frac{1}{2}$ inch rebated and beaded jamb linings, hung with $3\frac{1}{2}$ inch butts, and a 7 inch 3 bolts, brass knob, iron rim lock to each.

The door leading to area-steps to be 2 inch bead flush door, hung with $3\frac{1}{2}$ inch butts, 8 inch iron rim lock, two 8 inch barrel-bolts and chain, and hung to fir proper door frame.

Entrance-door. Fit up the entrance-hall doorway with $2\frac{1}{2}$ inch Honduras mahogany door, six panel moulded, with raised panels, as detail, hung folding, with fir proper door-frame and 2 inch rebated fan-lights, as before described.

A best 10 inch draw-back lock, with brass furniture complete, and two 12 inch brass rod-bolts and barrel door-chain, $3\frac{1}{2}$ inch iron butts, and centre knob of bronze to choice.

Best-room doors. Fit up the doorways opening into hall and vestibule, on ground and first-floor, with 2 inch Honduras mahogany doors, single hung to $1\frac{3}{4}$ inch rebated and beaded jamb-linings and soffits, grooved for plaster architraves, with two pairs of 4 inch brass butt-hinges, best mortise-locks (Hobb's patent, or other approved), and ebony furniture complete. The jamb-linings and soffits of ground-floor best-rooms to be mahogany; on first-floor to be deal. Put to all these doorways proper grounds, grooved for plastering.

Study-doors.

The study to have double doors; one level with hall, and the inner door level with study wall; also $1\frac{1}{2}$ inch doors, moulded only on one side, to shut off the lift and strong closet.

Put to the water-closet, lavatory, housemaid's-closet, and attic-doors, $1\frac{1}{2}$ inch four-panel square-framed doors, with $1\frac{1}{2}$ inch rebated and beaded jamb-linings, architraves, and 7 inch iron rim-lock and furniture complete. The water-closets to have water-closet-bolt and spring latch; and the door from back-stairs on half-landing, and lavatory-door at top of stairs, to be moulded on one side, similar to best doors, and to have the same furniture; other doors to have square panels and brass furniture.

Water-closet doors.

Fit up the water-closets in basement and attic with 1 inch deal seat, risers, flaps, and frames, with $\frac{3}{4}$ inch deal skirting round the seats, 3 inches high. Provide for all requisite bearers and for casing all pipes, with $\frac{3}{4}$ inch deal beaded casing. The water-closets on ground and first-floor to have inch Honduras mahogany risers, clamped flaps, seats, and frames, with moulded nosing, properly wrought, and French-polished mahogany skirting, 3 inches high; and put all requisite bearers and case all pipes with $\frac{3}{4}$ inch beaded casing, $\frac{3}{4}$ inch Honduras candle-shelves and boxes.

Wash-basins.

Enclose the underside of wash-basins in ground and first-floor with inch bead and flush circular framing.

Case cisterns.

Provide for casing the bottom of cistern over first-floor water-closet, to serve water-closet, lavatory, and bath in that floor, ground-floor, and basement, to hold 500 gallons; provide for casing 300 gallon cistern in attic-floor, and also 500 gallon cistern in scullery. Casings to be 1 inch square bead and flush framing, with man-hole complete. Provide proper fir bearers for each cistern.

Trim for bath.

Pipe casing.

Trim and prepare for bath in bath-room as shown on plan of floor joints. Case pipes where required, the pipes to come up in chase in walls. All pipe-casings to be screwed that they may, if required, be opened for examination or repairs.

Nursery-stairs. Construct a staircase from first-floor to attics with $1\frac{1}{4}$ inch deal treads and 1 inch risers, with moulded nosings to treads; 1 inch string, inch wall-string and proper carriages and brackets; strings ploughed for plastering; 1 inch square ballusters and moulded mahogany handrail $3\frac{1}{2}$ inch circular, with proper rim-joint, screws, and moulded newels. A cupboard to be formed under these stairs, with $1\frac{1}{4}$ inch cupboard front and door, and two tiers of 1 inch shelves on proper bearers; also, to have proper furniture and lock.

Slate shelves. Fit up the larder and cook's-closet with 3 tiers of inch slate shelves, with rubbed top and edge, on galvanized cast-iron uprights.

Marble shelves. Fit up also in larder two tiers of marble shelves where shown.

Store-closet. Fit up store-closet in kitchen, with 3 tiers of 1 inch deal shelves and bearers, and doors similar to room doors.

Dresser. Fit up a deal dresser, as on plan, with $1\frac{1}{2}$ inch keyed top rounded at the corners; inch deal pot-board and bearers; $1\frac{1}{4}$ inch framed rails, runners, and fillets, $2\frac{1}{2}$ inch square legs; 3 drawers, with inch fronts dovetailed and beaded, black knobs, $\frac{3}{4}$ inch bottoms and $\frac{1}{2}$ inch sides; $1\frac{1}{4}$ inch cut standards at ends; 3 sunk plate-shelves, averaging 7 inches wide, with proper brackets and bearers, and moulded fascia at top; the drawers to have locks, and shelves to have brass hooks.

Knife-board. Fit up two tiers of inch deal shelves for knives, where shown, on proper bearers.

Butler's sink and closet. Butler's rooms. Fit up an inch deal dresser-top, prepared for slate-sink, and cupboard under, with shelves and strong lock.

Fit up plate-closet with 3 tiers of 1 inch shelves on proper bearers, and $1\frac{1}{4}$ cupboard front, with two doors, and Hobb's patent lock.

Fit up in servant's-hall a $1\frac{1}{4}$ inch square framed closet, as shown, the whole height of room, with 5 tiers of inch shelves on proper bearers, and good cupboard locks.

Closet-backs. The closets generally will not have backs, the walls behind will therefore be finished similar to other parts of rooms.

Cupboards Fit up cupboard under slate sink, and slab in housemaid's-closet at half-landing, with proper lock and cupboard fastening.

Fit up $1\frac{1}{4}$ inch cupboard front, divided into three compartments, and three tiers of shelves in each, with proper bearers, cupboard locks to each door and turn-buckle in nursery where shown.

PLASTERER.

Plasterer. All work to be executed in the most workmanlike manner, with best fresh burnt chalk lime and clean sharp sand, and lath and half laths to the ceilings. The cement used to be of the best quality of their respective kinds, and mixed in proper proportions of sand.

Bracket. Bracket out and properly prepare for, in the most secure manner, the several projections shown to be intended by the drawings. Form all requisite splays, arrises, jambs, and soffits throughout, make good all defects, and leave the whole perfect at the completion.

Cement to walls. Form in Portland cement to a height of 4 feet the walls of all rooms and passages in basement, except butler's and servants'-hall, beaded when it joins the plastering (not including wine, beer, or coal cellars).

Form in Portland cement the window and door-jambs, sills, and soffits in basement, and all angles of chimney-breasts, archways, &c.

Form Portland cement skirting 7 inches high and $\frac{1}{2}$ inch projection to butler's and servants' hall.

Form in cement the walls of back stairs to a height of 3 feet 6 inches from basement to attic-floor, beaded where it joins the plastering, and also the walls and soffit of strong closet.

Render, float, and set walls. Render, float, and set, and thrice colour the walls of all rooms and passages in basement and back staircase (except wine, beer, and coal cellars), and soffits

of arch in passage. Lath, plaster, float, and set all ceilings.

Keene's cement. Form in Keene's cement, properly dubbed out, the moulded dados and skirtings throughout the ground and first-floor rooms, hall and vestibule, and best staircase, the whole to be in cement up to the height shown in detail drawings; form also the moulded architraves shown in section, and details for all doors and windows; also all the mouldings forming the bases and pedestals of columns; and also form the columns and niches to detail in hall, vestibule, and drawing-room; form also all architraves, frieze and arch mouldings, shown in drawings.

Form all exterior angles to chimney-breasts, or others, in Keene's cement.

Trowel stucco. Finish trowel stucco in the best manner for painting the walls of hall, vestibule, and best staircase.

Keene's cement. Form in Keene's cement the architraves and friezes, according to detail, of all doors and windows inside to ground and first-floor, provide for and finish the several enrichments shown and described in drawings.

Ceilings. Run round the several ceilings of hall, vestibule, passages, and rooms in ground and first-floor, the moulded plaster over cornices shown on all the drawings, properly bracketing for projections, and securely fixing blocks. Provide for and finish in the best manner the several enrichments shown to be required, a previous model to be submitted for approval to the architect.

Canvas plaster The covings of ceilings throughout, and the capitals to columns in vestibule and drawing-room, to be formed of canvas plaster, with proper bracketing, from full-size drawings which will be supplied.

Decoration. The whole of the Keene's cement decoration to be left ready for painting or other decoration.

Ceilings. Lath, plaster, float, and set, and whiten throughout all ceilings of first-floor and attics.

Lath, plaster, float, and set all partitions, and

plaster, float, and set all walls not otherwise particularly described.

Plain cornices.

Run plain cornices of 18 inches girt to all dressing-rooms, small bed-rooms, bath-rooms, closets, &c., in first-floor and lobby water-closet, and serving-room, ground-floor; the ceilings shown in detail applying only to the three best bed-rooms.

Run cornices of 18 inches girt to servants'-hall.

Cement skirtings.

Run cement skirtings to all rooms and passages of attics, 7 inches high and $\frac{1}{2}$ inch projection.

SLATER.

Cover the roofs with countess green Welsh slates, with proper lap, upon $\frac{3}{4}$ inch slating battens, and 2 cut copper nails to each slate.

Slate fittings.

Fit up in the pantry and housemaid's-closet $\frac{3}{4}$ inch patent slate sinks 9 inches deep, with rubbed inside face and edges, grooved and jointed with red lead cement; each sink to have a brass washer trapped or bell-grate, and fit up $\frac{1}{2}$ inch rubbed slate skirting at backs and ends, 8 inches high. Provide and fix upon sufficient bearers, as shall be considered best during the progress of the works, proper patent slate

Cisterns.

cisterns, to contain as follows:—basement, 500 gallons; attic-floor, 300 gallons; and 500 gallons on first-floor. The two largest cisterns to have 2 inch bottoms and $1\frac{1}{2}$ inch sides; small ditto, $1\frac{1}{2}$ inch bottom and $1\frac{1}{4}$ inch sides, properly grooved and jointed with red lead cement, and secured by iron bolts sheathed in lead pipe. (These slate fittings are not recommended; see galvanized iron cisterns as described on p. 105).

Hips.

The hips are not to have lead rolls, but the slates to be cut neatly, and a small concealed lead gutter of 5lbs. to be formed in angle.

PLUMBER.

Water service.

Lay on water from the main in road with $1\frac{1}{4}$ inch wrought-iron welded pipes to the first-floor and attic cisterns, and 1 inch ditto to the basement cistern.

Put ball-cocks to each, $1\frac{1}{2}$ inch standing trumpet-wastes, and perform other requisite plumber's work to make the cisterns complete. All bends, T's, and junctions, are to be perfect, and to be hot turned, all cocks to be full way, and to be patent for high pressure supply, and the whole of the pipes to be tested previous to their being covered up.

W.C.'s. (See p. 105).

Waste-pipes. (See p. 105).

Lavatory. (See p. 105).

Soil pipes. (See p. 105).

Water waste preventer. (See p. 105).

Hot water service. (See p. 106 and 302).

Butlers'-sink. (See p. 259).

Testing. (See p. 106).

Urinal. Fit up in ground-floor water-closet a patent Jenning's urinal in corner; lay on water by $\frac{3}{4}$ inch lead service, with $\frac{3}{4}$ inch brass way-cock, $1\frac{1}{2}$ inch waste.

Water service. Lay on water to housemaid's-sink and butler's-pantry with $\frac{3}{4}$ inch lead service, and $1\frac{1}{2}$ inch waste and bell-trap, and $\frac{3}{4}$ inch brass way-cock.

Lay on water to larder by $\frac{3}{4}$ inch service and cock.

Lay on water to sink with 1 inch lead service-pipe, bell-trap, 2 inch waste, and 1 inch brass water way-cock.

Lay on water from rain-water-tank with $1\frac{1}{2}$ inch lead suction-pipe to sink, and an iron lift-pump, properly cased.

All wastes to be trapped before entering the drains.

Rain-water-pipe.

Build in each angle of vestibule, where shown on plan, 3 inch lead pipes to carry off the rain-water from the centre of building; these to be cased, where possible, for examination, and to have close iron gratings in cess-pool-gutter, to prevent the admission of dirt, &c. (This was necessitated from the plan of the building, but should never be used if in any way it can be done without).

Roll 5lb. lead rolls, 7 inches wide, over divisions in skylight, fastened with lead-headed nails.

Gutters and flats.

Lay the whole of the flats and gutters with 7lb. lead, turning up 6 inches against the parapets and 12 inches over the lear-boarding and curbs of skylight, with $1\frac{1}{2}$ inch drips, $1\frac{1}{2}$ inch fall in 10 feet, and deep cess-pools.

Cover trap in roof with 6lb. lead, projecting over trap 6 inches, and fastened with lead-headed nails.

Stepped flashings.

Flash with 5lb. lead, 6 inches wide, properly dressed and fastened with wall-hooks, and stepped to the slopes of roof, to all chimneys, and wherever required, dressed 5 inches upon the slating, and round the skylights.

Ridges.

Put 6lb. lead, 22 inches wide, to the ridges, properly lapped and secured with lead-headed nails.

Provide the lead flashings shown in sills and heads of windows in detail drawing.

Rain-water-pipes.

Put three stacks of 4 inch cast-iron rain-water-pipes with cast heads, and No. 5 stacks of 5 inch ditto to choice, from the eaves of roof, and from flats of projection bays, and carried into drains.

Set to eaves cast-iron eaves'-gutter, moulded as shown, with joints set in red lead, and properly set upon cornice in cement.

Provide and fix, where shown, No. 4 3 inch lead pipes, to carry the rain-water from centre gutters; to have cess-pool at head, and proper grating to prevent the admission of refuse.

Generally. Provide all solder, lead-headed nails, wall-hooks, hold-fasts, and other materials of the kind; perform all labour in joints or otherwise for executing in the most workmanlike manner the plumber's work. Also provide all lead required by masons, for joggling or otherwise; for the smith's for bedding with lead the flanges of girders; and for any purpose required in the performance of works comprised in this specification.

The lead to be properly milled pig-lead, free from all defects.

GLAZIER.

Basement windows. Glaze with $\frac{1}{8}$ inch thick Hartly's patent the whole of the windows of basement and fixed sashes in ditto, also the inner sash of ground-floor water-closet and back stairs, and lower division of best staircase window.

Water-closet window. Glaze the outer sash of ground-floor window on right hand of south elevation with embossed glass.

Fanlights. Glaze the fanlights in patterns, as shown, in best crown glass.

Ground-floor Glaze the whole of the windows in ground-floor with best British plate in squares, as shown by drawings.

First-floor. Glaze the first-floor windows with 21oz. patent plate glass in squares, as shown on drawings.

Skylight. The inner skylight over vestibule to be glazed in embossed glass, with diaper or other pattern to choice, each division of skylight to be glazed with sash-bars arranged in pattern similar to sketch. The inner skylights of attics to be glazed with the best seconds crown glass in squares.

Glaze the outside skylights with rough plate $\frac{3}{8}$ inch thick, secured and perfectly water-tight.

Glaze the inside arcade of attic-floor with strong ground glass in large squares.

Generally. Red-lead, putty, and back-putty all glazing, and use the best putty, clean all windows, repair damaged

puttying or glazing, and leave all perfect at the completion and rendering up of the works.

Fixed sashes. Glaze the fixed sashes, lighting the lobby and water-closet, first-floor, with ground glass in squares.

Provide and fix Moore's patent ventilators to each fixed sash in butler's-room, in basement, and to all fixed sashes in water-closets and lobbies throughout.

Staircase-window. Provide £5 extra, to be spent, if desired, upon the staircase-window in coloured glass.

Hartley's glass. NOTE.— Care to be taken that the Hartley's glass have the flutes upright and all one way, and picked evenly faced.

PAINTER.

Generally. Use the best white lead and linseed oil, and perform the painter's work in the best manner, properly priming.

Paint four times in oil colour the whole of the external wood-work and iron-work usually painted, except the mahogany.

French polish. French polish to approval all the mahogany-work specified in Joiner.

Paint four times in oil colour, to choice, the whole of the deal joiner's work and iron-work usually painted. The bed-rooms and dressing-rooms on first-floor to have an extra flatting coat.

Paint four times in oil, and flat the whole of the walls of hall, staircase, and vestibule, including the walls behind the arcades, and also the skirtings, and up to top of dado of rooms. Paint four times in oil and flat party tint the cement dressings to doors and windows, and columns and arcades, also caps, &c., to columns in hall, vestibule, and drawing-room.

Provide the sum of £10, to be spent, if required, in the decoration of cornices and ceilings.

Paint four times in oil the cement wall in basement and attics.

Properly prepare with size, and finish in distemper, the ceilings of ground and best rooms on first-floor; whiten the remainder of ceilings.

Colour in the best manner, strongly sized, the whole of the basement-walls and soffits, where not otherwise described.

Leave the whole of the painting, and distempering, and colouring, clean and free from stains at the completion of works.

SMITH.

Smith.

The cast-iron to be of the best soft grey metal, to be cast free from blemish or other defects, and proved before being fixed. The wrought-iron is to be the best quality, well hammered or rolled, and free from flaws.

Rolled girders.

Provide and fix, and screw upon bearers at each end, two 10 inch rolled-plate iron girders, to carry inner skylight, two to be the full length of the vestibule, and 18 inches longer than opening for bearing, and six 6 inch rolled iron joists, to be also fixed so as to form the skylight into panels, as sketch. Girders to be properly plated at the joints with top and bottom flanges.

Iron in roofs.

Provide and fix 1 inch wrought-iron straps to each principal of roofs, and provide for suspension rods of partitions 2 cwts. of wrought-iron in bolts, and all proper nuts, plates, and screws.

Columns.

Provide and fix two cast-iron columns, 5 inches diameter, with caps and bases, let into sill and run with lead, and stone springers above top of caps.

Window-guards.

Fit to windows throughout basement wrought-iron framed guards, viz., $\frac{3}{4}$ inch round iron, 5 inches apart, with top and bottom wrought rail, $1\frac{1}{2}$ inch by $\frac{1}{2}$ inch, fixed into the jambs of windows.

Back-stair balusters.

Provide and fix to the back staircase $\frac{3}{4}$ inch square iron balusters, one to each step on the straight part of stairs, and rounded iron hand-rail, to include fixing.

Best-stair ditto. Provide for the hand-rail to best-stairs, £20, and fixing into steps where and how directed.

Provide and fix swing casements to light and ventilate attics, as described in Carpenter, to work easily and with necessary ends and wall-hooks, that their openings may be regulated.

Provide an approved iron door and frame for strong closet on ground-floor.

Provide for 6 inch cast-iron bell-traps, in each of the areas, let into York stones, properly rebated and fixed over drains.

Provide the several cast-iron galvanized supports and brackets to the fittings generally as directed, and the several cast-iron gratings to admit air under the boarded floors of basement; also the several gratings specified for the mouths of air flues elsewhere described.

Provide and fix properly, as specified in Joiner, Clark's patent shutters.

Provide for separate boiler, piping and gratings for warming the vestibule, hall, and staircase, £30.

Provide for lift complete, from kitchen to hall, £15 complete.

Provide for kitchen-range complete, £25, and setting.

Provide for boiler, bath, hot-water-tank, and pipes, £50. (Or see p. 106).

Provide for scullery-range	£5	0	0		and setting
„ play-room and servants'-hall	2	0	0	each	„
„ 4 best rooms	7	10	0		„
„ school-room	4	0	0		„
„ best bed-rooms and 1 dressing-room	4	0	0		„
„ dressing-room and bath room	1	0	0	each	„

Provide for attics, £0 10 0 each and setting

„ nursery-range, with water laid on to boiler 5 0 0 „

The above grates will require to be set with fire-brick backs and interior, and tiles top and sides, splayed and fitted; the tiles are included in the above prices, but not the setting.

BELL-HANGER.

Bell-hanger.

The whole of the wires for the bell-hanging to be of copper, with all necessary cranks, levers, pulls, and tubes for the concealed wires; the bells to be light, of the best bell-metal of assorted tones, so as to be clearly distinguishable one from another.

Provide and hang the following bells, to be fixed upon a board and numbered, with patent pendulum indicator in basement-passage, from entrance back and front. All rooms on ground-floor, and all bed and dressing-rooms, and bath-room, on first-floor, a bell to ring in nursery, from the best bed-room, and one also from kitchen; also a bell from kitchen to nursery, and from school-room to nursery.

Bell pulls.

Provide for bell pulls the sum of £ to include fixing.

(If electric bells are desired, they should be described as follows):

Electric bells.

Provide from the outside doors all the rooms on the ground-floor, and all bed, dressing, and bath-rooms, and nurseries, electric bells, with insulated wires, battery, indicator box to be placed in the kitchen, ivory call buttons and gutta-percha tubing. The battery to be Daniell's, of sufficient strength to complete the circuit, and all to be given up at the completion in perfect working order.

CHAPTER XIX.

SPECIFICATION *of the works to be done in taking down the present* RECTORY-HOUSE, *and in erecting and completing fit for occupation a* NEW RECTORY-HOUSE *in the parish of* *in the county of Essex.*

BRICKLAYER.

Take down present rectory-house.

To take down and remove carefully the whole of the present rectory-house, including the kitchen and the cellar-story thereof, but leaving the dairy, the brew-house, the stable-offices, and other out-buildings, complete and free from damage as the same now are.

Digging, cartage, &c.

To dig out for all the foundations, the basement-story, the drains, and wherever else may be requisite in order to execute and complete the buildings and works according to the design thereof; to render hard and level the bottoms of all the trenches, and to fill in and consolidate properly the ground about all the footings and brick-work when laid; the ground is not to rise beneath the ground-floors higher than 9 inches below the sleepers.

To remove, dispose of, and make up, the superfluous ground resulting from the excavations, in such manner round the new buildings and upon the glebe as shall be by the architect directed.

Rubbish.

To clear out from the building from time to time, as by occasion may be required, all rubbish which may arise from the performance of the various works, and finally leave the house and building clear therefrom. The rubbish is to be shot and spread upon the premises of the glebe in the manner which the architect may direct.

Concrete.

(See p. 75).

General brick-work.

To execute all brick-work requisite for carrying into effect the design of the buildings according to the drawings, and to render the whole house and premises,

with the offices and appurtenances thereof, complete and finished in every respect.

Samples. (See p. 78).

Rough arches. To turn rough arches and counter-arches wherever the same can be put, through the entire thickness of the respective walls, except where in certain instances it may be found expedient not to continue the arches through to the external surface of the work: all the external arches are to be finished with neat tuck-pointing.

(For damp situations, see double walling pp. 239 and 280).

Brick facings and arches. To face with the best square hard-burnt and perfect bricks (with all the heading bricks carried through into the body of the work in every possible instance), the whole of the external brick-work of the principal building, with all the returns thereof; and to face in like manner all over all the chimney-shafts of the whole of the building: all the facings are to be finished with neat joints accurately struck.

To put to the chimney-stacks, and to all the openings in the walls described to be faced with bricks, gauged and rubbed arches.

To execute in bricks, moulded in the clay according to the drawings, the several splays, quoins, dentil-cornices, mouldings, and other external decorations of the house.

Chimneys. To properly turn, parget, and core all the flues; to put to each fire-place on the ground-story (that to the study excepted) a brick fender, 4 inches thick, for the support of the slab, with a foundation 6 inches high and 9 inches thick; to put to each of the other fire-places a 4 inch brick trimmer 12 inches longer than the chimney-opening.

Damp course. (See p. 240).

Drains. For drains, see p. 77, except that the drains are to communicate with the cess-pool.)

Cess-pool. To form a cess-pool 8 feet diameter and 10 feet deep, steined in 9 inch brick-work, and domed over

with man-hole and stone cover, and feet of 4 inch field-drain to the nearest outlet.

Rain-water-tank. To form a rain-water-tank, 6 feet diameter and 8 feet deep, steined and domed similar to the cess-pool, and feet of 4 inch overflow drain to the nearest outlet; lay also to a proper fall around the house 4 inch socket-jointed drain-pipes from the feet of all down pipes to communicate with the rain-water-tank.

Bedding, &c. To bed in mortar all the plates, lintels, wood-bricks, templets, and other timbers so requiring; to bed and point with lime-and-hair mortar all the door-frames and window-frames; and to back up with solid brick-work to all the timbers, stone-work, and other things to be set into the brick-work.

To set in cement the two top courses of the walls under the eaves, and all projecting or oversailing courses of walls and chimneys.

Piers under ground-floors. To put under all the sleepers of the ground-floors, brick piers, placed with the centre of one pier distant not more than 3 feet 6 inches from the centre of the next pier, and 6 courses high, the lower course being 9 inches square, and the other three courses 9 inches by $4\frac{1}{2}$ inches.

Brick flat paving. To pave with hard stock paving-bricks, laid flat in mortar, and grouted between the joints with liquid mortar, the whole of the cellars.

Cellar-stairs. The cellar-stairs to be formed of brick, with oak nosings, carefully laid upon proper foundations.

½ rod extra brick-work. To provide under the contract one-half of a rod reduced of the best stock brick-work, to be used in such extra works not intended to be done in the necessary work of the buildings, but in such extra works as the architect may direct, the value of such of the said extra brick-work as may not be directed to be used, is, however, to be deducted from the amount of the consideration of the contract, after the rate of per rod reduced, and the contractor is to execute at the like price of per rod reduced all such further extra brick-work as the architect may direct to be executed.

Tile paving. (See p. 283).

Bricks. The sound bricks in the present building may be used again in the new building, after being properly cleaned; all the other bricks, except the white facing-bricks, are to be new approved hard-burnt square grey stock-bricks, free from breakage and from all admixture of soft bricks, place-bricks, or other inferior bricks.

Mortar. The whole of the mortar to be used in the work is to be compounded in the proportion of one-third by measure of the best stone-lime, and two-thirds by measure of clean sharp river sand (*or good road drift, as the case may be*), properly beaten and worked up together.

Mode of doing the work. No four courses of work are to rise more than one inch besides the height of the bricks; all the foundation-works, and other works not intended to be faced, are to be carried up throughout their whole thickness with English bond.

Groove and fillet. To form a groove 2 inches wide and 2 inches deep in all walls and chimneys where the roofs finish against them, and into which the slates are to be inserted and finished with a flush cement filleting.

Scaffolding, &c. To provide, maintain, alter as occasion may require, and finally remove, all scaffolding requisite for the performance of the whole of the works of every kind of the entire building, with sufficient poles, cords, ropes, planks, ladders, tackle, and other proper appurtenances.

Jobbing-work. (See p. 79).

MASON.

To put to the porch and other outer doorways steps of rubbed solid Yorkshire stone, properly back-jointed and fix complete; and to form the pavement of the porch upon an arch of 4 inch brick-work.

Dressed stone. (See p. 263).

Kitchen pavement. Pave the portion of the kitchen-floor, coloured blue on the plan, with 2 inch rubbed York paving, set in mortar, upon a bed of concrete 5 inches thick.

Sink. To put in the scullery a sink of 7 inch Yorkshire stone, 2 feet by 3 feet, cut out to receive the pipe and bell-grate. (See also p. 81).

3 marble chimney-pieces, &c., 5 guineas each chimney. To provide and fix in the study, dining-room, and drawing-room, three marble chimney-pieces with slabs value in the whole fifteen guineas, exclusive of the fixing and carriage.

Portland stone chimney-pieces. To provide and fix Portland stone jambs, mantles, and shelves, to all the other fire-places throughout the building, those of them to the kitchen-chimney to be of 2 inch Portland stone, each 8 inches wide, and those of them to the other chimneys to be of $1\frac{1}{4}$ inch Portland stone, and 6 inches wide.

Hearths and slabs. To put to each fire-place a hearth of $2\frac{1}{2}$ inch rubbed Yorkshire stone; to put to the kitchen a slab of $2\frac{1}{2}$ inch rubbed Yorkshire stone, 2 feet wide; and to put to all the other chimneys of every kind throughout the building, except to the dining-room and drawing-room, slabs of 2 inch Portland stone each 18 inches wide, and 12 inches longer than the chimney-opening.

Sundries. To work all requisite back-joints, rebates, fair edges, grooves and holes; to round off all corners where requisite; and to perform the other work and labour proper and usual in and about mason's work; and to complete the mason's work to the satisfaction of the architect.

SLATER.

(If the roof is tiled, see p. 211).

Countess slating. To slate the whole of the sloping parts of the roof over the house with the best strong countess slates.

Nails, bond, &c. (See p. 82).

Hips. To neatly cut the slates at all hips.

Pointing. To point with lime-and-hair mortar the whole of the slating on the inside thereof.

Ridge tiles. (See p. 211).

Reparation. To repair and leave perfect, to the satisfaction of

the architect, all the slating at the final rendering up of the works as complete.

CARPENTER AND JOINER.

New materials, &c. To provide sufficient new materials for and frame and fix all carpenter's work and joiner's work of every kind which may be requisite for carrying into effect and for finishing in every respect the building and its appurtenances according to the drawings, and to complete the same in every respect fit for occupation.

Timber and deals. (See p. 82).

Old timber. Any of the old timber that is sound and good, and of proper scantling, can be used in the roofs and joisting.

Ironmongery. To provide and fix to the whole of the carpenter's work and joiner's work all proper and necessary nails, spikes, screws, and other sufficient ironmongery, and also all requisite brass-work. All the ironmongery and brass-work are to be of the very best quality.

Sundries. To provide and fix all requisite shores, struts, puncheons, oak-wedges, ties, cletes, beads, stops, fillets, tilting-fillets, backings, blocks, linings, casings, furrings, and rolls; to provide all moulds, rods, and patterns requisite for setting out and for executing all the various works; to fix all the iron-work; and to perform such rebating, grooving, tonguing, beading, scribing, chamfering, housing, jointing, framing, dovetailing, planing, and other work and labour, as may be found requisite for the perfect performance and the thorough completion of the whole building and its appurtenances.

Centering. To provide, fix, ease when so directed, and finally remove, centering and turning-pieces for all the gauged and rough arches and trimmers.

Wood-bricks. To put all wood-bricks requisite for receiving the ends of the templets and for such finishings as may so require.

Lintels. To put to all the windows and doors the requisite lintels of fir 4 inches high by the width of the wall, and 15 inches longer than the clear opening.

Wrought timber.

Any of the timbers exposed to view, such as the ends of the rafters, the beams over the hall, and the staircase-ceiling, to be wrought, chamfered, and stopped as indicated on the drawings.

	Ins.	Ins.
Ground floors over the cellar.		
Wall-plates	4 by	$2\frac{1}{2}$
Fir joists	8	2
Trimmers and trimming-joists	8	3
$1\frac{1}{4}$ inch yellow deal ploughed and tongued boarded floors, listed free from sap-wood.		
Flooring to the remainder of the ground-story.		
Oak sleepers not more than 4 feet apart ...	4	3
Fir joists	4	2
1 inch yellow deal straight-joint boarded flooring of half boards, listed free from sap-wood.		
Floors to the chambers.		
Wall-plates	4	4
Joists	8	2
Trimmers and trimming-joists	8	$2\frac{1}{2}$
Boarded flooring composed of the present boarded floors of the house, gauged to the same width, laid with straight joints, and made complete with all requisite work and new materials.		
Remainder of the one-pair-flooring.		
Wall-plates	4	$2\frac{1}{2}$
Six binders within the beams of the hall-ceiling	7	$4\frac{1}{2}$
Joists	$4\frac{1}{2}$	2
Trimming-joists	4	$2\frac{1}{2}$
Inch white deal boarded floor of half boards. If any of the boarded floorings of the present house remain sound and to spare, after completing the floors above described, the same may be used for completing the flooring of the one-pair-story of the new house, instead of new deal.		
Roof.		
Wall-plates	4	4
Four tie-beams	10	$3\frac{1}{2}$
Angle-ties, each 5 feet long	4	$2\frac{1}{2}$
Dragon-pieces	4	2
Rafters (two thirds thereof formed out of the sound timbers of the present house) ...	6	2
Hips and ridges	9	$1\frac{1}{4}$
Valley-pieces	8	3

	Ins.	Ins.
Joists for flat, average	6 by 2	
Inch yellow deal boarding for the lead-work, with furrings $1\frac{1}{2}$ inch current to every 10 feet		
$\frac{3}{4}$ inch yellow deal slate battens 2 inches wide		
$\frac{3}{4}$ inch deal lear-boards 10 inches wide.		
All requisite tilting-fillets and fittings complete.		
Inch yellow deal tongued and beaded fascia 6 inches wide, and $\frac{3}{4}$ inch yellow deal soffit.		
Ceiling-joists spiked in one length beneath the tie-beams	3	2

To put in the roof a dormer complete, with strong framing, and with inch deal ploughed, tongued, beaded, and ledged outer door, $1\frac{1}{4}$ inch deal square framed inner trap-door, inch deal linings, slate battens, bolts, hinges, and all other proper fittings and appurtenances.

Cradling.

To form out the ceiling over the entrance-hall into panels, according to the drawings, with cradling of yellow deal securely fixed.

Angle-staves.

To put to all the projecting angles of the internal brick-work, proper rebated angle-staves; those used in the stucco-work, and in the dining-room, and drawing-room, and study, are to be beaded (except when cement angles are specified).

Quartered-partitions to inclose the dressing-room, &c.

	Ins.	Ins.
Sills	4 by	3
Upper plates	4	3
Collar-plates above the doorways	4	3
Door-posts and angle-posts	3	4
Braces framed at bottom into the sills, and at top into the posts	3	3
Two tiers of inter-ties to each story... ...	3	$1\frac{1}{2}$

Wall wainscoting.

To put all round the walls of the nursery the dwarf wainscoting of the large parlour of the present house, repaired, altered, adapted, and made complete with the requisite new materials and appurtenances.

Skirtings.

To skirt the dining-room and the drawing-room with moulded skirting, with proper grounds and backings, according to the drawings.

To skirt with $\frac{3}{4}$ inch yellow deal square skirting 6 inches high, plugged to the walls, all the remainder of the rooms, passages, and other parts of the building intended to be plastered.

Casements. Form to all the one, two, and three-light windows, one, and to the four-light windows, two opening-casements of $1\frac{1}{4}$ inch oak, with proper sills, heads, brass butt-hinges, fastenings, and stay-bars complete.

Old windows. In the kitchen, and where indicated upon the elevations, fix the best of the old sash windows, repaired thoroughly, and the sashes re-hung with patent lines, and other fittings complete.

Shutters, &c. To fit up the windows of the dining-room and drawing-room with $1\frac{1}{4}$ inch shutters two panels high, the fronts of the front shutters framed and moulded to correspond with the doors of the same rooms, and all the remainder of the shutters framed square, hung in two heights, with strong spring shutter-bars, and with $1\frac{1}{2}$ inch proper boxings sunk and finished with mouldings to correspond with those of the architraves round the doors; inch deal square-framed back-linings two panels high, $1\frac{1}{4}$ inch moulded one-panel backs, elbows, and soffits, to correspond with the doors, beaded capping and elbow-caps, and all other requisite fittings complete.

Sliding shutters. To fit up the window of the study with $1\frac{1}{4}$ inch sliding shutters framed square each in three panels, hung in deal-cased frames, with mouldings round the same to correspond with the door architraves, and with lines, weights, and pulleys; to put to the same window $1\frac{1}{4}$ inch deal window-back to correspond with the shutters, with beaded cappings thereto hung with hinges; and to put to the shutters brass thumb-screws.

To fit up all the remainder of the windows with inch ploughed and tongued V jointed linings; and to put to the kitchen-window, shutters composed of the shutters of the present house, altered, adapted, and hung complete with the requisite fastenings work and appurtenances.

$2\frac{1}{2}$ inch doors and fanlight. To put to the two principal external doorways, $2\frac{1}{2}$ inch ovolo sashed doors, moulded in front and

chamfered at the back, with inch deal panels, and hung each with three 4 inch butt-hinges, and with other ironmongery in addition thereto, value 12*s.*; and to put thereto $1\frac{1}{4}$ inch deal bead-flush and square-framed shutters, with wrought-iron corner-shoes and thumb-screws. To put over the principal external doorway a 2 inch deal moulded semi-circular-headed fanlight.

2 inch doors and fanlights.

To put to the other external doorways of the house, 2 inch four-panel bead-flush and square-framed doors, hung each with a pair of 4 inch butt-hinges, and with other ironmongery in addition thereto, value 10*s.*; and to fit up over the same external doors next the kitchen-court, with fanlights composed of the windows of the present house, repaired, adapted, and made complete.

To fit up the dining-room and drawing-room with 2 inch deal doors, moulded both sides, the folding-doors, hung with three pairs of 4 inch butt-hinges, a best mortise-lock with ebony furniture, and two brass flush bolts, one thereof 8 inches long, and the other thereof 3 feet long; the other doors hung each with a pair of 4 inch butt-hinges, and a best mortise-lock with ebony furniture.

$1\frac{1}{4}$ inch closet-doors.

To fit up all the closets with $1\frac{1}{4}$ inch four-panel doors with $\frac{3}{4}$ inch deal panels, hung with 3 inch butt-hinges and 4 inch strong closet-locks, the doors to the closets of the dining-room and drawing-room are to be moulded in front, and to have furniture to correspond with the other moulded doors; all the other closet-doors are to be framed square on both sides.

2 inch doors.

To put to all the remainder of the doorways on the ground-story and one-pair-story of the house, 2 inch deal four-panel square-framed doors with $\frac{3}{4}$ inch deal panels, hung each with a pair of 3 inch butt-hinges, and a best mortise-lock with plain solid brass furniture.

To fit up the doorways of the offices with some of the best of the doors of the present house, repaired, altered, adapted, hung with new 3 inch butt-hinges, and made complete with new 7 inch best stock-locks, and all other proper work and appurtenances.

Door-linings. To fit up all the doorways of the building with $1\frac{1}{4}$ inch framed, tongued, and rebated linings, those thereof more than 10 inches wide panelled and finished to correspond with the respective doors hung therein, but each jamb and each soffit being framed in only one panel in width, and the same number of panels in height as the doors.

Door-cases. To put to the office doorways, and to the external doorways on the ground-story, proper door-cases 4 inches by 4 inches, those to the cellars being of oak.

Architraves, &c. To put on both sides of all the doors, except the offices, throughout all the building, inch yellow deal grooved grounds, those thereof next the entrance-hall to be 6 inches wide, and all the remainder $4\frac{1}{2}$ inches wide; to put all round all the doors in the dining-room and drawing-room moulded architraves, 4 inches by 2 inches, according to the drawings; and to put all round on both sides of all the other doors throughout the whole building, mouldings to correspond with the mouldings of the architraves.

Principal staircase. To construct the staircase leading from the entrance-hall to the one-pair-story according to the drawings, with $1\frac{1}{4}$ inch clean yellow deal feather-tongued risers, treads, and landings, on very strong bracketed carriages, and with moulded returned nosings, $1\frac{1}{4}$ inch string-boards, $1\frac{1}{4}$ inch beaded sunk and mitred outer-strings, 1 inch deal apron-linings, oak polished, moulded, and ramped hand-rail, and turned balusters 1 inch diameter; the newels to be of oak, $3\frac{1}{2}$ inches diameter, with turned mouldings, and cut tops and pendents.

Basement staircase. To inclose the head of the basement internal staircase by $1\frac{1}{2}$ inch square-framed spandril-partition, with panels of $\frac{3}{4}$ inch deal not more than 10 inches wide, and with a four-panel door therein to match the partition, hung with a pair of 3 inch butt-hinges and with two 8 inch barrel-bolts.

Closets. To fit up and inclose the several closets and other parts of the house, where requisite, with $1\frac{1}{2}$ inch deal square-framed partitions, and inclosures with $\frac{3}{4}$ inch deal panels not more than 10 inches wide.

To fit up the closets on the inside thereof each with three tiers of inch deal shelves as wide as the

closet will admit of, except where otherwise shown by the plans, and fixed with the requisite bearers.

Cistern, &c. To form the ceilings of the water-closet and adjoining lobby with plates 4 inches by 4 inches and joists 6 inches by 3 inches, and lay the joists with $1\frac{1}{4}$ inch yellow deal to serve as a bottom to the cistern, to be formed over the same; and to cover over the cistern with a lid made of inch yellow deal, ploughed, tongued, and ledged, having a large saddle-back fillet and four water-grooves to each joint thereof, and laid upon strong bearers and with a trap-door therein hung with strong hinges.

Water-closet. To fit up the water-closet with inch fine Honduras mahogany, framed and moulded riser, and clamped and moulded flap and frame, inch pencil-cedar seat, $\frac{1}{2}$ inch Honduras mahogany skirting over the seat, all requisite strong bearers, $1\frac{1}{4}$ inch yellow deal pipe-casings with strong rebated and beaded grounds, hinges, buttons, and other fastenings complete; to attend upon the plumbers while fixing the pipes and apparatus, to cut holes, and find and perform all other needful work and labour for making the water-closet complete.

Kitchen dresser, &c. To put in the kitchen a dresser with drawers, shelves, pot-board, and fittings complete, value £6.

Jobbing-work. To perform to the whole of the buildings and works, and to their appurtenances, all such carpenter's work and joiner's work as may be requisite thereto in the nature of jobbing.

PLASTERER.

L. P. F. S. ceilings, &c. To lath, plaster, float, and set ceilings and strings to the whole of the ground-story and to the whole of the one-pair-story of the house.

Troweled stucco. To execute all the sides of the principal staircase, entrance-hall, and the lobbies therewith connected, with the best floated troweled stucco, lathed where requisite.

L. P. F. S. sides. To lath, plaster, float, and set all the quartered-partitions of the building.

R. F. S. To render, float, and set all the remainder of the internal brick-work of the building, that to the cellars and offices excepted.

Cornices, &c. To execute according to the drawings plain cornices to the dining-room and drawing-room, and to the entrance-hall; and to form in the ceiling.

Sundries. All the requisite lathing and countering-lathing is to be performed; all the laths are to be of heart of fir.

To execute all requisite beads, quirks, and arrises; to stucco all the internal reveals; to perform all requisite dubbing out; to find all additional thicknesses; and to form all needful mitres.

Whiting. To whiten all the ceilings, strings, and plaster cornices throughout the house.

Colouring. To colour of a tint of stone-colour as shall be directed the plastered walls and sides of the kitchen, pantry, and china-closet, and of all the other plastered parts of the house which are not intended to be papered.

SMITH AND PLUMBER.

Chimney-bars. To provide and fix to each of the fire-places, with projecting chimney-breasts, a wrought-iron chimney-bar $1\frac{1}{2}$ inch by $\frac{1}{2}$ inch, properly corked at the ends thereof.

Air-grates. To provide 13 cast-iron air gratings 9 inches square, and to fix the same round the lower part of the walls of the house to ventilate under the boarded floors.

3 cwt. ties, &c. To provide 3 cwt. of iron in such ties, bolts, nuts, screws, straps, and other light wrought and hammered work as may be by the architect directed.

6lb. milled-lead gutters, flat, and valleys. To lay the flat, chimney-gutters, and valleys with the best milled-lead, weight full 6lbs. to the foot superficial, turned up full 6 inches against all brick-work and other perpendicular sides, and full 10 inches

high against the rafters; and the lead to the valleys is to be full 20 inches wide.

4lb. milled-lead flashings. To put flashings of 4lb. milled-lead 5 inches wide round all the chimney-gutters and to the flats where requisite.

4lb. milled-lead to hips and ridges. To lay under all hips a concealed gutter, 6 inches wide, of 4lb. milled-lead, upon proper layer-boards.

Eaves'-guttering. To put all round the projecting eaves of the house 4 inch semi-circular cast-iron eaves'-guttering, fixed on sufficient strong wrought-iron brackets. and jointed with white lead.

R. W. P. To put from the eaves'-guttering to the cistern two stacks of cast-iron rain-water-pipes $2\frac{1}{2}$ inches bore, with neat heads of approved pattern, and fixed complete.

Water-closet. (See p. 105).

Soil pipe. (See p. 105).

Waste pipe. (See p. 105).

Service pipe. (See p. 105).

Cistern. To line with lead the cistern, the bottom thereof with cast-lead 8lbs. to the foot superficial, and the sides thereof with milled-lead 5lbs. to the foot superficial; to lay on the water to the sink in the scullery with sufficient $\frac{3}{4}$ inch strong service-pipe, with cock and other proper fittings complete, and to put to the cistern a strong $1\frac{1}{4}$ inch waste-pipe. (See also p. 106).

Pump. To fit up in the scullery a force-pump with $1\frac{1}{2}$ inch lead pipe from old well, and 1 inch service-pipe to cistern; $\frac{1}{2}$ inch warning-pipe, and all appurtenances complete.

Soft-water-pump. To fit up a house-pump in scullery, with $1\frac{1}{2}$ inch iron pipe, spout, and casing complete.

Grates and ranges. To provide and set grates to the best rooms,

				average price	£4	0	0
,,	,,	,,	,,	bed-rooms	1	0	0
,,	,,	,,	,,	kitchen	7	10	0

Sink, &c. To put from the scullery-sink to the outside gulley a 2 inch strong waste-pipe with a brass bell-grate thereto.

PAINTER.

Preparation. To knot, stop, pumice, and smooth in every part, and prepare properly in the most perfect manner, all the wood-work and other works intended to be painted.

Four times in oil. To paint four times in good oil colour all the internal and external wood-works and iron-works, all the stucco, and all the other works, where all the said works are usually painted.

Flatting. To flat extra of such tints as may be by the architect directed, the whole of the stucco work and all the wood-work of the ground-story (that to the kitchen, office-passage, pantry, china-closet, store-closet, and the insides of the other closets excepted) and of the staircase, passage, and lobby of the one-pair-story, and also of the two southern chambers; the work of the dining-room and of the drawing-room is to be finished in three tints.

GLAZIER.

Best glass. To glaze all the windows of the dining-room, of the drawing-room, of the best two chambers, of the entrance-hall, and of the staircase, with the best Newcastle crown glass.

Quarry glazing. To glaze the lights above the transoms in lead lights in quarries and small squares formed in simple patterns, and cemented into the grooves of the stonework.

Second glass. To glaze all the remainder of the windows and lights throughout the building with good clear second Newcastle crown glass.

Cleaning, &c. The whole of the glazing is to be properly bedded, bradded, and back-puttied, and is to be cleaned and left perfect at the final rendering up of the works as complete.

PAPER-HANGER.

Preparation. To prepare properly all the walls and surfaces intended to be papered, and to bring the same out to a proper face.

Dining-room and drawing-room, per yard underlined.

To underline with strong paper and hang with figured paper, value per piece, cut close round the edges thereof, the whole of the sides of the dining-room and of the drawing-room.

Study and best two bed-rooms and dressing-rooms, per yard.

To hang with figured paper, value per piece, cut close round the edges thereof, the whole of the sides of the study, those of the best two chambers, those of the dressing-rooms, and those of the closets thereto attached.

Other paper, per yard.

To hang with figured paper, value per piece, cut close round the edges thereof, the whole of the remainder of the chambers on the one-pair-story, and all the closets thereto attached.

BELL-HANGER.

To provide and fix with cranks, wires, pulls, and all other proper work and appurtenances of the best quality the following bells.

Two door-bells fixed in the office-passage, one thereof with a brass-pull at the side external gate of the office-court, and the other thereof with a brass-pull in the front porch.

Three bells in the office-passage, with neat brass lever-pulls, one thereof in the dining-room, another thereof in the drawing-room, and the other thereof in the study.

One bell in the office-passage with a pull in the best chamber.

One bell in the servants'-chamber with a pull in the best chamber.

CHAPTER XX.

SPECIFICATION OF THE WORKS *to be done in erecting and completing fit for occupation a* RECTORY-HOUSE *at* .
(The Living attached to which Rectory-house is of the value of £800 per annum.)

BRICKLAYER AND WALLER.

Digging, cartage, &c. To remove, dispose of, and make up the superfluous ground resulting from the excavations, in such manner round the new buildings as shall be by the architect directed.

Rubbish. (See p. 76).

Concrete. (See p. 75).

Rough arches. (See p. 76).

Brick-work. To build the whole of the internal walls, coloured red on the plans, and the internal face of the external walls with sound, hard, approved bricks in mortar; a space to be left between the inner and outer faces of the walls of $2\frac{1}{2}$ inches, and the two thicknesses to be bonded together at every course by header bricks, placed 2 feet 3 inches centre and centre. (See p. 239.)

Damp course. (See p. 240. Asphalte from $\frac{1}{8}$ to $\frac{1}{4}$ inch in thickness makes also an extremely good damp course).

Chimney-shafts. Build the chimney-shafts in brick-work, faced with picked stocks and bedding in the stone caps, shown on the elevations.

Chimneys. To properly turn, parget, and core all the flues; to put to each fire-place on the ground-story a brick fender 9 inches thick, in order to support the chimney-slab; to put to each of the other fire-places a 4 inch brick trimmer 18 inches longer than the chimney-opening.

Bedding, &c. (See p. 77)

Drains. (See p. 77).

Cess-pool. (See p. 77).

Rain-water-tank. (See p. 77).

To construct to each of the privies a cess-pool, 6 feet deep and 3 feet 6 inches internal diameter, steined round with 4 inch dry brick-work. (See p. 77).

Well. To dig a well feet deep, steined round in dry brick-work, and domed over as described for cess-pool, where indicated on the plans.

Piers under ground-floors. To put under all the sleepers of the ground-floors brick piers, the centre of one pier distant not more than 3 feet from the centre of the next pier, and each pier four courses high, the lower course of brick-work being 9 inches square, and the other three courses 9 inches by $4\frac{1}{2}$ inches.

Brick-paving. To pave the cellar with brick-on-edge paving, set in mortar, on 4 inches of concrete.

Tile paving. (See p. 283).

Three rods extra brick-work. (See p. 78).

Bricks. All the bricks are to be the best new approved hard-burnt square stock-bricks, free from breakage, and from all admixture of soft bricks, place bricks, or other inferior bricks.

Mortar The whole of the mortar is to be compounded in the proportion of one third by measure of the best stone-lime, and two thirds by measure of clean sharp river sand, properly ground in a mill.

The mortar used in any considerable work should be ground in a mill: when the dimensions of a work are such as to create no additional expense by the use of a mill, any additional dimensions to the building will cause a saving in the ratio of the price of labour by the use of such a mill.

Mode of doing work. No four courses of work are to rise more than one inch besides the height of the bricks, all the

foundation-works and other works not intended to be faced with bricks are to be carried up throughout their whole thickness with English bond, in order to prevent the bad union of two different kinds of bond.

Stone walling.

To build the outside facing of all external walls with walling-stone from the quarry at , the face-work to be quarry-bedded and hammer-dressed on the face, care to be taken to give the work a naturally irregular appearance, keeping the beds horizontal as far as possible, and bonding the whole together with through stones every yard superficial, and also carrying up the walls with the internal facing described in the brick-work.

MASON.

Dressed stone-work.

(See p. 263).

Cellar-stairs.

To construct the cellar-stairs with treads and risers of 3 inch tooled Yorkshire stone paving, wrought with fair edges, and properly pinned into the brick-work.

2½ inch Yorkshire stone paving to covered-way and passage.

To pave the covered-way in the office-court, and the passage from the kitchen thereto, with tooled Yorkshire stone, not in any part thereof less than 2½ inches thick, and close jointed, and in regular courses.

Rubbed stone steps and landings.

To put to the porch, to the external recess adjoining to the outside of the store-room, and to all the external doorways of every kind, 6 inch landings and steps, all of rubbed Yorkshire stone, properly back-jointed and fixed complete.

Sinks.

To put in the scullery a sink of 7 inch Yorkshire stone, 2 feet 6 inches by 3 feet 6 inches, cut out to receive the pipe and bell-grate; and to provide and fix where the architect shall direct four five-hole sink-stones, each sunk out of a piece of 4 inch Yorkshire stone 15 inches square. (See also p. 81).

To provide and fix chimney-pieces and slabs as follow:—

3 chimney-pieces £12 each. A marble chimney-piece to each of the best rooms on the ground-story, value £12, exclusive of the fixing and carriage thereof.

3 chimney-pieces £6 each. A marble chimney-piece to each of the best three chambers, value £6, exclusive of the carriage and fixing thereof.

Stone chimney-pieces. Dressed stone jambs, mantles, and shelves to all the other fire-places throughout the buildings, those to the kitchen-chimney to be of 2 inch stone and each 8 inches wide, those to all the other chimneys to be of $1\frac{1}{2}$ inch stone and 6 inches wide.

Hearths and slabs. A hearth of $2\frac{1}{2}$ inch rubbed Yorkshire stone to each fire-place: a slab of $2\frac{1}{2}$ inch rubbed Yorkshire stone 2 feet wide to the kitchen; and to put to all the other chimneys, of every kind, throughout the buildings, except to the best three rooms, slabs of 2 inch Portland stone, each 18 inches wide and 12 inches longer than the chimney-opening.

Cleaning off stone-work, and sundries. To clean off, shortly before the final rendering up of the works as complete, all the stone-work of every kind; to take out and replace every stone which may then appear in any way defective; to provide all requisite bond-stones, lead plugs, and copper cramps; to work all requisite back-joints, rebates, fair-edges, grooves, and holes; to round off all corners where requisite; and to perform the other work and labour proper and usual in and about mason's-work, and to complete the mason's-work to the satisfaction of the architect.

SLATER.

(For Tiler, see p. 211.)

Countess slating. To slate the roofs of the whole of the building with the best strong Countess slating, laid with proper bond.

Nails, bond, &c. (See p. 81).

Hips. (See p. 81).

Pointing. To point the whole of the slating on the inside thereof with stone-lime mortar, with sufficient hair therein.

Ridge tile. (See p. 211).

Reparation. To repair and leave perfect, to the satisfaction of the architect, all the slating, at the final rendering up of the works as complete.

CARPENTER AND JOINER.

New materials, &c. (See p. 82).

Timber and deals. (See p. 82).

Wrot timber. (See p. 310).

Ironmongery. (See p. 309).

Sundries. (See p. 82).

Centering. To provide, fix, ease when directed, and finally remove, centering and turning-pieces for all the gauged and rough arches and trimmers.

Casing to stone-work, &c. To case up all the stone-work and the angles of the brick-work in manner sufficient to preserve the same from injury during the carrying on of the works.

Wood-bricks. To put all wood-bricks requisite for receiving the ends of the templets, and for such finishings as may so require.

Lintels. To put to all the windows and doors the requisite lintels, 3 inches high by the width of the wall, and 15 inches longer than the clear opening for 3 feet openings, and 1 inch higher for every clear foot of openings beyond 3 feet.

Ground-floors. Over the cellars.

	Ins.	Ins.
Binding-joists not more than 4 feet apart...	10 by	6
Ditto, within 6 inches of the walls... ...	10	3
A cast-iron socket, weight 28lbs., on each end of each binding joist to prevent the ground from rotting the timber.		
Joists bridged above the binding-joists ...	4	2
Trimmers to ditto	4	$2\frac{1}{2}$
$1\frac{1}{4}$ inch ploughed and tongued yellow deal boarded flooring, listed free from sap-wood.		

		Ins.	Ins
To the remainder of the story.	Oak sleepers not more than 4 feet apart ...	4 by	3
	Oak joists	4	2
	$1\frac{1}{4}$ inch yellow deal straight-joint boarded flooring, listed free from sap-wood.		
One-pair-floors of the principal building.	Wall-plates	4	4
	Joists	10	$2\frac{1}{4}$
	Trimmers	10	3
	Two tiers of herring-bone struts down the flooring of each room.		
One-pair-floors to remainder of building.	Inch white deal, straight, joint-boarded flooring.		
	Wall-plates	4	4
	Joists	9	$2\frac{1}{4}$
	Trimmers	9	3
	One tier of herring-bone struts down the middle of each room.		
	Inch white deal folding flooring.		
Attic-floors, trusses, &c.	Girders or tie-beams	12	6
	Principals	6	6
	Queen-posts	7	6
	Collars	6	6
	Binding-joists framed into the tie-beams and not more than 5 feet apart ...	10	6
	Joists corked above the binders	5	2
	Ceiling-joists spiked each in one length beneath the binders	2	$1\frac{1}{2}$
	Boarded flooring of inch white deal laid folding.		
Roof over the main building.	Wall-plates	4	4
	Rafters	6	$2\frac{1}{4}$
	Head plates	10	4
	Hips	10	2
	Valley-pieces	8	3
	Joists for flat, average	8	2
	Inch yellow deal boarding for the lead-work; furrings $1\frac{1}{2}$ in. current to every 10 feet; $2\frac{1}{2}$ inch drips so disposed as that the sheets of lead may not be longer than 15 feet, rolls for the seams of the lead; inch yellow deal sunk gutters to the flat, chimney-gutters, and South gutters, with framed bearers, drips, and currents, the same as the furrings.		

$\frac{3}{4}$ inch yellow deal slate-boarding to the flattest parts of the roof over the two bows, and $\frac{3}{4}$ inch yellow deal slate battens $2\frac{1}{2}$ inch wide to all the remainder of the roof.

All requisite tilting-fillets and fittings complete.

		Ins.	Ins.
Flats over the bay windows.	Wall-plates...	4 by	4
	Joists notched out at the ends to form gutters	8	2

Furrings to form current $1\frac{1}{2}$ inch to every 10 feet, inch yellow deal gutter and boarding for lead, rolls for the seams of the lead-work, and all fittings complete.

Two trusses, &c., to support the backs of the flats over the projecting bays, and upon which the fronts of the attics are to be formed.	Tie-beams	12	6
	Principals	6	5
	Collars	6	5
	Queens	6	6
	Angle-posts	6	5
	Long plates above the collars	6	4
	Oak framed weathered and throated sills, filled in between the queens	10	$4\frac{1}{2}$
	Muntins above the oak sills	6	3

Roof over the scullery, larder, and passage.	Wall-plates...	4	3
	2 angle-ties, each 5 feet long	4	3
	2 dragons, each 3 feet long	4	2
	2 ties	6	$2\frac{1}{2}$
	Rafters	4	2
	2 hips, rounded for lead	$1\frac{1}{4}$	8

1 inch soffit-board of yellow deal, 4 ins. wide.

$\frac{3}{4}$ inch yellow deal slate battens, $2\frac{1}{4}$ ins. wide.

Roofs over the covered way, knife-house, wood-house, coal-house, shed, and privies.	Wall-plates...	4	3
	Wrought breast-summers and ties ...	8	4
	4 wrought angle-ties, each 4 feet long ...	4	$2\frac{1}{2}$
	Head plates...	4	$2\frac{1}{2}$
	Rafters (wrought smooth)...	3	2
	2 wrought valleys	4	4

$\frac{3}{4}$ inch yellow deal slate-boarding, clear of sap-wood.

$\frac{3}{4}$ inch yellow deal lear-boards, 10 inches wide, where requisite.

Oak turned columns, 5 inches diameter, with turned capitals, and with socket-bases of cast-iron, each weight 14lbs.

Roof over the one-pair-story of the remainder of the building.

	Ins.	Ins.
Wall-plates...	4 by	4
3 ties	8	$3\frac{1}{2}$
5 angle-ties, each 5 feet long	5	3
One dragon-piece, 3 feet long	5	$2\frac{1}{2}$
Ridges and hips	$1\frac{1}{4}$	$8\frac{1}{2}$
Ditto, to the narrowest span	4	2
Valley	7	4
Inch yellow deal soffit-board, 6 inches wide.		
$\frac{3}{4}$ inch yellow deal slate-battens, $2\frac{1}{4}$ ins. wide.		
Ceiling-joists spiked in one length beneath the ties	3	2

Quartered-partitions.

Plates carried below the doorways wherever possible	$4\frac{1}{2}$ by	4
Upper plates	4	4
King-posts and queen-posts	5	4
Collar-plates above the doorways... ...	4	4
Door-posts and angle-posts	$3\frac{1}{2}$	4
Braces framed at bottom into the plates and at top into the posts	$3\frac{1}{2}$	$3\frac{1}{2}$
2 tiers of inter-ties to each story... ...	3	$1\frac{1}{2}$

Skirtings.

To skirt the best three rooms on the ground-story with skirting 18 inches high, consisting of double plinth 14 inches high and mouldings 5 inches girth, with all proper grounds and backings thereto.

To skirt the best three chambers, the entrance-hall, the principal staircase, and the passages, and lobbies on the ground-story and one-pair-story of the main building, with double rebated plinth $3\frac{1}{2}$ inches high, and base-mouldings $4\frac{1}{2}$ inches girth, with all proper grounds and backings.

To skirt with inch square skirting 6 inches high, plugged to the walls, all the remainder of the rooms, passages, and other parts of the building intended to be plastered.

Casements.

(See pp. 208, 312).

Shutters.

To put to all the windows of the best rooms on the ground-story, and to the two entrances of the main building, $1\frac{1}{4}$ inch chamfered and beaded shutters, two panels high, to correspond with the doors, hung in

two heights, with strong spring shutter-bars; and with $1\frac{1}{2}$ inch proper boxings, finished with mouldings to correspond with those of the architraves round the doors; inch deal bead-flush back-linings two panels high; $1\frac{1}{4}$ inch moulded backs, elbows, and soffits to correspond with the shutters; beaded capping, and elbow-caps; side-linings returned outside the boxings, and all other requisite fittings complete.

To fit up all the remainder of the windows on the ground-story, marked S on the ground-floor plan, with $1\frac{1}{4}$ inch clamped shutters with rule-joints, hung complete with inch linings, finished with mouldings like those round the doors, and wainscot dove-tailed bars with cast-iron sockets.

$2\frac{1}{2}$ inch doors.

To put to the principal two external doorways $2\frac{1}{2}$ inch ovolo sashed doors, moulded on both sides, with inch deal panels, and hung each with three 4 inch butt-hinges, and with other ironmongery to each, value 20*s*.

2 inch doors.

To put to all the other external doorways of the building 2 inch four-panel bead-flush and square doors, hung each with a pair of 4 inch butt-hinges and other ironmongery, value 15*s*.

To put to all the remainder of the doorways on the ground-story and one-pair-story of the main building 2 inch deal four-panel doors with $\frac{3}{4}$ inch deal panels, moulded according to the drawings, and hung each with a pair of 4 inch butt-hinges and other ironmongery, value 15*s*.

2 inch doors.

To put to all the doorways of the basement-story 2 inch four-panel doors bead-butt on both sides, hung each with a pair of 4 inch butt-hinges and fastenings to each, value 7*s*.

To fit up all the remainder of the doorways of every kind throughout the entire building with $1\frac{1}{2}$ inch four-panel square-framed doors with $\frac{3}{4}$ inch deal panels, and hung each with a pair of $3\frac{1}{2}$ inch butt-hinges and other ironmongery, value 10*s*.

Door linings.

To fit up all the doorways of the building with $1\frac{1}{4}$ inch framed, tongued, and rebated linings, those

thereof more than 10 inches wide framed and finished to correspond with the respective doors hung therein.

Door-cases. To put to the cellar-doorways oak proper door-cases 5 inches by 4 inches, and to put to all the external doorways throughout the building fir proper door-cases 5 inches by 4 inches, inserted into the stone steps, with stub tenons.

Architraves, &c. To put on both sides of all the doors throughout all the buildings inch yellow deal grooved grounds $4\frac{1}{2}$ inches wide; to put all round all the doors on the ground-story and one-pair-story of the main-building moulded architraves 4 inches by $2\frac{1}{2}$ inches, according to the drawings; and to put all round on both sides of all the other doors throughout the whole building mouldings 4 inches girth laid upon the grounds.

Principal staircase. To construct the principal staircase according to the drawings, with $1\frac{1}{4}$ inch best clean yellow deal feather-tongued risers, treads, and landings, on very strong bracketed carriages, and with moulded nosing; $1\frac{1}{4}$ inch string-boards; $1\frac{1}{4}$ inch beaded, sunk, and mitred outer-string, chamfered, and moulded, and stopped oak newels, 3 inches square, with tops and pendents cut to a simple ornament; $1\frac{1}{4}$ inch apron linings; moulded and polished oak hand-rail; and turned balusters one inch diameter.

Back-staircase. To construct the back-staircase, according to the drawings, with $1\frac{1}{4}$ inch yellow deal steps, risers, and landings, feather-tongued and housed into 2 inch yellow deal string-boards, moulded planceer; turned and framed newels $3\frac{1}{2}$ inches by $3\frac{1}{2}$ inches; wainscot, moulded hand-rail with mitred caps; and dove-tailed bar-balusters $1\frac{1}{8}$ inch square.

Closets. To fit up the closets shown by the drawings with $1\frac{1}{4}$ inch four-panel doors, finished and fitted up to correspond in all respects with the doorways of the respective rooms and other parts of the building in which they are placed. To fit up the closets on the inside thereof with one hundred feet superficial of inch shelving fixed with the requisite bearers.

Water-closets, cisterns, privies, &c. To fit up the two water-closets with inch fine Spanish mahogany framed and moulded risers and clamped and moulded flaps and frames, inch pencil-

cedar seats, $\frac{1}{2}$ inch Spanish mahogany skirting over the seats, all requisite strong bearers, $1\frac{1}{4}$ inch yellow deal pipe-casings, with strong rebated and beaded grounds, hinges, buttons, and other fastenings complete; to attend upon the plumbers while fixing the pipes and apparatus; to cut all requisite holes, and find and perform all other needful work and labour for making the water-closets complete.

To fit up the wash-hand-basin in the water-closet with a Spanish mahogany inclosure, value 30*s*.

To put in the water-closets, and where else may be directed, three dove-tailed cistern-cases of 2 inch deal, each to contain 30 cubic feet of water, fixed with strong bearers, and with a ledged cover to each cistern of $\frac{3}{4}$ inch yellow deal tongued and beaded.

To fit up each of the privies with inch clean deal seat, riser, and clamped flap and frame, with all requisite bearers, skirtings, and other fittings complete.

Fittings in the butler's-pantry, £10.

To fit up the butler's-pantry with dresser, sink, and other fittings, value £10.

Kitchen dresser, 8 guineas.

To put in the kitchen a dresser with drawers, shelves, pot-board, and fittings complete, value £5.

Fittings in the larder.

To fit up the larder with $1\frac{1}{2}$ inch clean deal dresser-top 2 feet 6 inches wide, feather-tongued, and fixed on strong framed legs and rails; two meat rails, each 6 feet long, of wrought fir $3\frac{1}{2}$ inches by 2 inches, suspended by wrought-iron stirrups; and a hanging shelf of $1\frac{1}{4}$ inch clean deal 10 inches wide 6 feet long, and suspended also by wrought-iron stirrups.

Sink on the one-pair-story.

To put on the one-pair-story a dove-tailed sink of $1\frac{1}{2}$ inch deal, and to inclose the same with $1\frac{1}{4}$ inch deal square-framed front and door, the door hung with $3\frac{1}{2}$ inch butt-hinges and with other ironmongery, value 7*s*.

Fittings in office-court.

To put in the buildings of the office-court a knife-board value 10*s*., and an inclosure and other fittings to the coal-house and wood-house, value together £3.

£20 other fittings. To provide and fix such other fittings, of the value of £20, as shall be by the architect directed.

Jobbing-work. (See p. 103).

100 feet cube fir extra. (See p. 310).

SMITH.

Chimney-bars. To provide for each of the fire-places, with projecting breasts, a wrought-iron chimney-bar 3 inches by ½ inch, properly corked at the ends thereof.

Air-grates. To provide 20 cast-iron air-gratings 9 inches square, to be fixed round the lower parts of the walls to ventilate under the boarded floors.

5 cwt. ties, &c. To provide 5 cwt. of iron in such ties, bolts, nuts, screws, straps, stirrup-irons, and other light wrought and hammered work, as may be by the architect directed.

Grates and ranges (See p. 103).

PLASTERER.

L. P. F. S. ceilings, &c. To lath, paster, float, and set ceilings to the whole of the ground-story and one-pair-story of the main building, including the soffit of the principal staircase.

Troweled stucco. To execute all the sides of the dining-room, principal staircase, entrance-hall, and the lobbies therewith connected, of the main building, with the best floated troweled stucco.

Gauged stuff. To execute in gauged stuff the ceilings of the entrance-hall and of the inner lobby on the ground-story between the beams.

L. P. F. S. sides. To lath, plaster, float, and set all the partitions of all the remainder of the main building.

R. F. S. To render, float, and set all the brick-work of the main building.

L. P. S. ceilings, &c. To lath, plaster, and set in an even and correct manner, the ceilings, strings, and quartered-partitions throughout all the remainder of the building.

R. S. To render and set in an even and correct manner all the internal brick-work of the remainder of the building.

Cornices, &c. To execute the following plaster cornices and enrichments:

Plain cornices to the best three rooms on the ground story 16 inches girth, with three enrichments thereto, girth together 9 inches.

Plain cornices to the entrance-hall, principal staircase, all the lobbies of the main building, and to all the rooms on the one-pair-story of the main building, 12 inches girth.

Sundries. To provide and execute all the requisite lathing and counter-lathing: all the laths are to be heart of fir lath-and-half laths free from sap-wood.

To execute all requisite beads, quirks, and arrises; to stucco all the internal reveals; to perform all requisite dubbing out; to find all proper additional thicknesses; and to form all needful mitres.

Whiting. To whiten all the ceilings, cornices, and enrichments, throughout the buildings (or to colour the same, as the case may be).

Colouring. To colour of a tint of stone-colour, as shall be directed, all the plastered walls and sides of the interior of the building where the same are not papered.

Lime-whiting. To stop neatly and lime-whiten twice all the internal brick-work of the cellar, and such of the other internal brick-work of the building as is not herein directed to be plastered; to lime-whiten in like manner the timbers and soffit of the flooring above the cellars, and the timbers and soffit of the roofs over the small office-buildings round the yard or court.

PLUMBER.

6lb. lead flats, gutters, and valleys. To lay all the flats, gutter-boards, chimney-gutters, and valleys, with the best cast-lead of equal thickness, weight full 6lbs. to the foot superficial, turned up

full 6 inches against all brick-work and other perpendicular sides, and turned up full 10 inches against the rafters: all the flats are to be laid with rolls not more than 2 feet 3 inches apart, and the lead to the valleys is to be full 18 inches wide.

5lb. milled-lead flashings.

To put flashings of 5lb. milled-lead 5 inches wide round all the gutters and flats where requisite.

5lb. milled-lead step-flashing.

To put step-flashings of 5lb. milled-lead, average 16 inches wide, to the ends of the roofs where the same gable or rake against the brick-work.

Iron eaves'-guttering.

To put to all the remainder of the eaves of the building 4 inch cast-iron guttering, jointed with white lead, and fixed upon strong wrought-iron brackets.

Cast-iron R. W. P.

To provide and fix the following stacks of cast-iron rain-water-pipes continued from the roofs quite down into the drains, and with heads and shoes complete.

Five stacks from the principal roof $3\frac{1}{2}$ inches bore.

Four stacks from the other roofs 3 inches bore.

2 water-closets. (See p. 105).

Waste-pipes. (See p. 105).

Lavatory. (See p. 105).

Soil-pipes. (See p. 105).

Hot water service. (See p. 106).

3 cisterns.

To line with lead the three cisterns, the bottoms thereof with cast-lead, 7lbs. to the foot superficial, and the sides thereof with milled-lead 5lbs. to the foot superficial; to lay on the water to the several cisterns with sufficient inch strong lead service-pipe, with cocks and other proper fittings complete; and to put to each cistern a strong lead $1\frac{1}{4}$ inch waste-pipe. (See also p. 106).

Sinks, &c.

To put in the lower water-closet a blue wash-hand, basin with washer, plug, and $1\frac{1}{2}$ inch strong waste-pipe; and to lay on the water thereto with $\frac{3}{4}$ inch strong lead pipe, cock, and the other proper fittings and appurtenances complete; to line the sink on the one-pair-story and the sink in the butler's pantry with

lead the same as described to the cisterns; and lay on the water thereto, as described to the lower water-closet; to put thereto, and to the scullery sink, 2 inch strong waste-pipes with brass bell grates.

Pump, 1½ inch pipe, &c.

To provide and fix a 3 inch lifting force pump with brass barrel, worth not less than £10, and put from the well one hundred feet run of 1½ inch very strong suction-pipe with joints complete.

PAINTER.

Preparation.

To knot, stop, pumice, smooth in every part, and prepare properly in the most perfect manner, all the wood-work and the other works intended to be painted.

4 times in oil.

To paint four times with the best oil colour all the internal and external wood-works and iron-works, all the stucco, and all the other works where all the said works are usually painted.

Flatting.

To flat extra, as may be directed, the whole of the staircase, hall, lobbies, and passages, and dining-room and study, and the two water-closets, in two tints, and all the remainder of the wood-work of the ground-story and of the one-pair-story of the main building; the joiner's-work of the best three rooms on the ground-story is to be finished in three tints.

GLAZIER.

Best glass.

To glaze all the windows and lights of the ground-story and one-pair-story of the main building with the best Newcastle crown glass.

Quarry glazing.

(See p. 318).

2nd glass.

To glaze all the remainder of the windows and lights throughout the building with good clear second Newcastle crown glass.

Stained glass.

Provide the sum of £ for stained glass in the staircase window.

Cleaning, &c.

The whole of the glazing is to be properly bedded, bradded, and back-puttied, and is to be cleaned and

left perfect immediately before the final rendering up of the whole of the works as complete.

PAPER-HANGER.

Preparation.

To prepare properly all the walls intended to be papered, and to bring the same out to a proper face.

Drawing-room and study paper , border , underlined.

To underline with strong lining-paper and hang with figured paper, value per piece, with border at top and bottom value per piece, the whole of the drawing-room.

2 water-closets, best 3 chambers, and dressing-rooms, &c., paper , border .

To underline with strong lining-paper and hang with figured paper, value per piece, and the whole of the best three chambers, and the lobbies, dressing-rooms, and closets thereto attached.

Back staircase, other chambers, &c., &c., paper .

To hang with figured paper, value per piece, cut close, the whole of the back staircase and the whole of the remainder of the chambers on the one-pair-story, and all the closets, lobbies, and passages thereto attached.

CHAPTER XXI.

A SPECIFICATION *of the several artificers' works to be done in erecting and completely finishing a new* CHURCH *upon a plot of ground at , in the parish of and diocese of , according to the drawings, and under the superintendence of Mr. , of , architect.*

BRICKLAYER.

Level foundations.

To level the ground of the intended site for the building.

Rubbish.

To procure, and shoot about the intended foundations, sufficient hard rubbish in order to raise the ground for the extent of 10 feet upon the surface on every side beyond the intended artificial foundation, hereafter described, and for the height of 6 feet above the lowest part of the present surface of the building-plot; to fill up in like manner with hard rubbish the internal part of the building, to the height of 6 feet 6 inches above the present lowest level of the ground; to pour water from time to time at every 6 inches in depth of the rubbish in order to consolidate the same.

(This is intended for the erection of a building in a low situation, where it is intended that the ground should be raised considerably in the neighbourhood of the building.)

Digging.

To dig out the ground or rubbish wherever may be requisite for carrying into effect the building according to the design, and for the formation of the foundations to the several necessary depths and widths.

Clear away rubbish.

To clear out of the building from time to time all rubbish which may accrue within the same by reason of any works of any kind which may be carried on therein; and to leave the whole of the building and the plot of ground upon which the same is to stand, at the rendering up of the same finally as complete, clear and free from rubbish and useless materials of every kind.

Scaffolding materials, &c.

To provide, fix, maintain, alter from time to time as may be required by the various workmen, and finally remove and cart away when so directed, all manner of sufficient safe and convenient scaffolding, with all requisite poles, putlogs, ledgers, boards, wedges, cords, ropes, pulleys, ladders, and other things requisite for the performance of all the works of every kind soever in and about the building.

Water, &c. (accumulation of).

To draw off, pump, and remove away from the building, all injurious slop, soft soil, and water, which may come in upon or about the same by rain or otherwise; and to make good all damage which may occur thereby to the brick-work foundations and other works.

Concrete.

(See p. 75).

General brick-work.

To execute all brick-work requisite for carrying into effect and for completing the building and all its appurtenances, according to the drawings and under the directions of the architect.

Rough arches.

To turn arches and counter-arches according to the drawings, and wherever else the same can be put; the arches are in all cases to be turned quite through the whole thickness of the respective walls, with the exception of the outer 4 inches of the faced work, and the spandrils and heads of the blank recesses in the walls are to be filled in afterwards to the soffits of the arches.

Flues, &c.

To properly, turn, parget, and core the flue of the vestry-chimney and the flue from the heating chamber; and to put under the slab of the vestry fireplace a 4 inch brick fender 12 inches high.

Drains.

To form from the several rain-water-pipes 4 inch socket jointed drain-pipes, laid to a fall of $1\frac{1}{2}$ inch to 10 feet, and carried to the nearest public drain, 150 yards from the building.

Piers, pulpit, and font.

To build piers and other brick-work for the support of the pulpit and font, as shown by the drawings.

Piers under sleepers.

To put under all the sleepers beneath the floors brick piers not more than 3 feet apart, 9 inches square, and four courses high, and with one course of brick-work $13\frac{1}{2}$ inches square beneath the same.

Samples. (See p. 79).

To build the whole of the walls in brick-work, faced inside and out with picked stocks; and the interior of all walls to be filled in with good sound approved bricks.

Bond. Build all walls throughout in English bond.

Damp course. (See p. 240).

Mortar. (See p. 79).

Moulded bricks. Form all the brick arches, the splays, and moulded jambs of doorways and windows, projecting cornices, plinths, and projecting brick strings, in purpose made bricks, moulded in the clay of the exact size and form shown on the drawings.

Brick bands. The black (or red) bands and voussoirs, shown in the drawings, on both the exterior and interior, to be black (or red) all through their substance, and not stained or ruddled.

Cut all bricks necessary for the splays and heads of interiors of windows.

Form a small dry cess-pool under font, steined round in dry brick-work.

Form a chamber under heating apparatus, arched over, and paved with paving bricks.

Tile-paving. To pave the chancel with Godwin's red, black, and buff $4\frac{1}{4}$ inch tiles, with a proportion of one-fourth in number of the whole in glazed tiles, and one-tenth of the remainder to be figured encaustic tiles, laid in cement, upon a bed of concrete 4 inches thick.

Pave the nave, aisles, porch, vestry, and organ place, with Godwin's 6 inch square tiles, in mortar, upon 4 inch bed of concrete.

Grouting. The whole of the brick-work is to be grouted with liquid mortar at every alternate course thereof, particular care being taken that the facings of the work shall not be stained.

Mode of doing the work.

(See p. 78).

Reparation of accidents, &c.

The walls are to be built level and perpendicular, and should any damage occur thereto by accident, settlement, or otherwise, within 12 calendar months from the time of the building and works being delivered up as complete, the contractor is to make the same good at his own expense, as shall be by the architect directed.

Jobbing-work.

(See p. 79).

MASON.

Quality of the stone, &c.

The whole of the dressed stone is to be of the very best quality, free from shakes, vents, and all other defects; the whole of the stone is to be laid so as for pressure to consolidate the stone in the natural way of its bed, and is to be from the most approved stone, from the most approved quarries, from .

The dressed stone-work indicated on the elevations by a yellow tint, as the sills of windows, stone bands, arches, curved heads, tracery, buttress slopes, turret, chimney-capping, &c., to be carefully worked according to the drawings, to be set and bonded well with the brick-work.

The stones of the piers of nave arcade, to be the entire diameter of the base, shaft, and cap.

The joints of turret, copings, and window tracery, to have two hard stone dowels, $1\frac{1}{2}$ inch by 1 inch to each stone.

The copings to have springers, bonders, and capping stones, worked out of the solid, as shown on the elevations.

The stone gable-crosses to be set with a copper rod, 18 inches long, let into them and the capping-stone.

Build in weather-courses over all roofs, butting against walls, cut of the solid, with horizontal beds, and projecting 3 inches from the face of the walls, chamfered and throated

To set in the vestry an open fire-place, 2 feet 3 inches wide, with chamfered and stopped jambs and head, glazed tile back and hearth, and hard stone fender, 4 inches by 3 inches, set in the tile floor.

Provide and set a grate, p.c., £1.

Provide the sum of £ for the font.

Provide the sum of £ for the pulpit.

Provide the sum of £ for the reredos.

Provide and set steps down to the heating chamber of 2 inch York stone treads and risers, built in vestry wall, and with brick retaining wall, coped with dressed-stone chamfered coping.

Build in hook stones to all doorways, and run in with lead the iron hooks for hinges.

To leave blocks of stone the size shown on the details, for carving.

To provide the sum of £ for carving.

Set to the outside doorways, solid rubbed York steps, 6 inches high, the width of reveal, and 18 inches longer than the openings.

The chancel steps to be of Portland stone, 7 inches tread and 5 inches rise, chamfered on nosings, and rebated on the back joint.

Rectify damage, cut out, &c.

To rectify all damage of every kind which may arise from any cause whatsoever to any portion of the stone-work: to cut out for all mortises, tenons, iron-work, and wherever else may be requisite.

Work to be cleaned off at the completion of the contract.

The whole of the mason's work is to be cleaned off immediately prior to the completion of the other works of the contract.

TILER.

To tile the whole of the roofs with plain red roofing-tiles, laid with good bond, and hung with two oak pins to each tile, upon double fir tiling-laths (any old tiles that are sound can be used for this purpose).

Ridge tiles. Cover the ridges with ridge tiles of a plain pattern, with perforated flange, set in hair mortar.

Reparation. To repair to the satisfaction of the architect all damage which may occur during the progress of the works to the tiling, and to leave the same perfect at the opening of the church

CARPENTER AND JOINER.

Hoard. To put up, maintain, and clear away, when so directed, sufficient substantial hoarding, 6 feet high, to inclose the whole of the site of the intended church and of the works thereof.

Office for clerk-of-the-works. (See p. 267).

New materials. (See p. 82).

Timber and deals. (See p. 82).

Sundries. (See p. 82).

Case up stone-work. To case up all the stone-work during the progress of the other works to preserve the same effectually from injury.

Centering. To provide, fix, ease, when so directed by the architect, and finally remove, centering sufficient for turning all the arches.

Moulds, &c. To provide all moulds, rods, gauges, laths, and other things requisite in order to set out, form, and adjust properly, the various works.

Fix iron-work. To cut out for, and fix and adjust all the ties, straps, and other smith's work connected with the wood-work.

Roofs. To execute the whole of the roofs in the manner shown upon the drawings to detail, the scantlings in all cases to hold the dimensions shown on the drawings when fixed. All timber exposed to view to be wrought, and the whole to be framed and fixed together with oak trenails. The several straps and bolts indicated to be of wrought-iron.

Plates. The plates to be of English oak, in as long lengths as possible, and scarfed at the joints, the inner and

outer plates to be joined together every 3 feet by cross-pieces 4 inches by 4 inches, dove-tailed down upon them.

Tilting fillets. Tilting fillets at all eaves and gables, and eaves boarding the width of the projection of rafters.

Wood floors. Wood floors to have sleepers of oak 4 inches by 4 inches placed upon the brick-piers already specified, and upon a 9 inch retaining-wall to be built at the sides of tile-passages, joists 5 inches by $2\frac{1}{4}$ inches notched down upon the sleepers, and $1\frac{1}{4}$ inch yellow deal flooring of half boards, listed free from sap, the floors of chancel-seats to be raised 5 inches above the tile-floors, with an oak sill-piece $4\frac{1}{2}$ inches by 3 inches chamfered out and rebated on the back-joint.

Solid do. (See p. 395).

Nave seats. The nave-seats to be executed, according to the drawings, in pitch pine, with cut ends out of 2 inch stuff, chamfered and stopped, seats $1\frac{1}{2}$ inch stuff, backs $1\frac{1}{4}$ inch framing, capping 3 inches by $2\frac{1}{2}$ inches moulded.

To provide the sum of £ for chancel-seats.
" " " " altar.
" " " " altar-rail.
" " " " lectern.
" " " " credence and sedilia.

Doors. The doors to be framed inside with $1\frac{1}{2}$ inch framing, wrought, chamfered, and stopped, with cross-braces complete, and covered outside with upright oak boarding, ploughed, tongued, and V jointed.

Fillets on backs of rafters. To nail on the backs of all rafters, down the length of the rafter, over the plaster laths, fillets $1\frac{1}{2}$ inch by 1 inch, upon which the tile-laths are to be nailed, in order to preserve a space between the tiles and the plaster.

SMITH AND BELL FOUNDER.

Wrought-iron saddle-bars to windows. To provide for all the windows sufficient wrought-iron saddle-bars $\frac{5}{8}$ inch by $\frac{3}{4}$ inch, to be set 22 inches apart in the stone-work of the windows, and run in cement.

To put to each window, except the chancel-windows, a casement 2 feet 6 inches high, and the whole width of the light.

Rain-water-pipes. To put to the church two complete stacks of 5 inch cast-iron rain-water-pipes, two complete stacks of 4 inch cast-iron rain-water-pipes, and one stack of $2\frac{1}{2}$ inch cast-iron rain-water-pipe, the whole thereof to have proper shoes and swan-neck heads, and to be fixed complete.

Hinges. To provide the sum of £20 for wrought-iron hinges to the several doors, to be fixed by the contractor, and to provide to each exterior door 12 inch oak stock-locks, with wrought-iron escutcheons, and also wrought-iron latches, with ring handles and escutcheons complete, and to the double door of porch top and bottom wrought-iron bolts, the top bolt to have long wrought ornamental handle.

To provide all patterns requisite for the iron-work, according to the drawings and directions of the architect.

Fitting, &c. All the smith's-work and iron-founder's-work are to be perfect, and to be properly wrought from detail drawings.

Bell. To provide and hang in the bell-chamber of the tower a proper church-bell, 448lbs. in weight, with strong carriages of wood and iron, with proper mountings of bell-metal, and with ropes and all other appurtenances complete. The founder to be approved by the architect.

PLASTERER.

Floated ceilings, &c. To lath with lath-and-half heart of fir laths, and to plaster, float, and set, between the wrought rafters of the roofs, as shown on the detail drawings.

PLUMBER.

7lb. cast lead gutters. To lay all the gutters with cast-lead, weight 7lbs. to the foot superficial, turned up on one side 6 inches high against all the brick-work, and on the other side 10 inches wide against the lear-boards.

5lb. milled-lead flashings To put into the brick-work round all the gutters flashings of 5lb. milled-lead 6 inches wide.

5lb. milled-lead step-flashings, &c. To put to all the gables, and where the roofs abut against walls or chimneys, step-flashings of 5lb. milled-lead, 12 inches average width.

6lb. cast-lead valleys.

To lay the valleys with 6lb. cast-lead 20 inches wide.

PAINTER.

4 times in oil.

To rub down, smooth, prepare in a satisfactory manner, knot and stop properly, and paint four times with the best oil-colour, all the iron-work of every kind, and all the wood-work, except the oak that is shown on the exterior, of every description, throughout the building; the first two coats of colour upon all the iron-work are to be of red-lead, painted before the work is fixed.

Staining.

To stain in two coats, and twice varnish, the whole of the timbers of roof showing inside the building, and the whole of the seats and other interior work in deal.

GLAZIER.

To glaze the whole of the windows in strong cathedral glass in squares and quarries averaging 4 inches square, set in strong approved leads, with an inch margin round all lights and tracery forms; the glass to be in two tints, and carefully cemented into the grooves of the stone-work, and tied with copper-wire to the saddle-bars.

To clean the whole of the windows, when so directed, immediately prior to the opening of the church, and to leave all the glass then finally perfect.

CHAPTER XXII.

Specification for constructing a new roof *to a* church.

WALLER.

Internal and external scaffoldings. (See p. 337).

Ladders, tackle, &c. (See p. 337).

Alteration and removal of the scaffolding. (See p. 337).

Tarpaulings. To provide, apply, and maintain to all the roofs of the church, during the time the same are being stripped and laid open, tarpaulings sufficient for preventing all damage by reason of wet to the seats of the church, the pulpit, font, and other furniture.

Pulling down, &c. To take down from the building all the parapets and walling indicated on the sections to be new by a red tint.

Reparation, &c., of walls. To take off all the unsound walling (*if any*) from all the walls immediately below the intended new roofing; and to repair, raise, and make good all the walls of the church with sufficient new walling, in order to receive the intended new roofing.

Bedding, &c. To bed in stone-lime mortar all the plates of the roofing, and to point to the same.

Parapets, &c. (*if any.*) To rebuild the whole of the walls in and about the roofing of the church in the same form as at present (*or according to the drawings, as the case may be*) with good strong mortar, and point the new work in a similar manner to the old.

½ rod extra brick-work. (See p. 78).

Rubbish. (See p. 76).

Jobbing-work. (See p. 79).

MASON.

Taking off, &c., copings, &c. (*if any*).

To take off all the stone copings from the parapets of the church.

New copings (*if any*).

To provide and fix all along the parapet of the church new stone coping, moulded in front, throated at both edges, and with solid quoin-stones of the sections shown on the drawings.

Old copings.

To cover all the remainder of the parapets and with the best of the present copings reworked at the ends and edges thereof, and as may be otherwise requisite, and providing new coping sufficient for making up all deficiency, and corresponding in nature with the old copings.

Cramps, &c.

(See p. 339).

Cornice and parapet of stone (*if any and if removed*).

To take down and remove carefully the whole (*or such parts as may be intended*) of the parapets and cornices of the church.

To re-joint and re-work, as far as may be requisite, the sound portions of the said cornice and parapet, and to re-set the same, and to provide and fix new blocks of cornice, new parapet, sufficient to complete the building, and to restore thereto the parapets, and the whole thereof being of the best new stone, to correspond in dimensions, scantling, and workmanship, with the original sizes and forms of the cornices, parapets, and of the church.

TILER.

(See p. 340).

CARPENTER.

Take off old timbers.

To take off from the building all the trusses, plates, and other timber-work of the roofing.

Old timbers.

To examine carefully all the old timbers of the roofing, to select such portions thereof as remain completely sound, undecayed, and perfect, and which agree

in scantling, dimensions, workmanship, and fashion with the directions hereinafter contained for the intended new roofing, or which will so agree therewith after having been re-worked and adapted.

(If all the timbers are to be new, this clause is to be omitted, but another clause conveying to the contractor the old timber, &c., should be then inserted.)

New materials. To provide new materials sufficient for the construction and completion of the intended new roofing and for the performance of the attendant works.

To provide and execute all work and labour proper and requisite for the thorough completion of the intended new roofing; and to provide, fix, and apply thereto, all requisite iron spikes, nails, screws, and other proper ironmongery.

All the oak timber is to be of English growth from , and all the other timber is to be the very best yellow fir from Dantzic, Riga, or Memel; all the boardings are to be of the very best yellow Christiana deal, except where herein otherwise directed.

All the timber and deals are to be cut out quite square and perfectly free from the very least sap-wood in any part thereof, and from shakes, large knots, wany edges, and all other defects.

New roof. To construct to the whole of the new roofing, according to the working-drawings, properly wrought and framed, and put together (of oak or fir), with oak trenails, and the various wrought-iron bolts shown on the drawings. (See p. 341).

Plates. (See p. 341).

Boarding and felt. To board upon the back of the rafters with 1 inch yellow deal or oak boarding, laid close joint; and nail upon the back of the boarding a layer of tarred felt, properly lapped.

Tilting fillets. (See p. 342).

The whole of the timbers to be fixed the full scantling marked upon the drawings.

PLASTERER.

To cut out all the broken and defective plastering in the interior of the walls (if any), and make good the same; leave the whole in good condition.

SMITH AND PLUMBER.

Gutters. (See p. 343).

Flashings. (See p. 343).

Step-flashings. (See p. 343).

Rain-water-pipes. (See p. 343.)

CHAPTER XXIII.

A SPECIFICATION *for* TAKING DOWN *and* RE-BUILDING *the* UPPER PART *of the* TOWER *of the* CHURCH *of* , *in the County of* , *and for certain repairs and other works connected therewith.*

BRICKLAYER.

Scaffolding, tackle, &c.

To provide, erect, maintain during the carrying on of the works, alter from time to time as may be found requisite, and finally remove, when so directed by the architect, a complete and safe scaffolding round the whole of the church-tower, from the ground to the top thereof, with all requisite poles, braces, ledgers, putlogs, boards, ladders, cords, wedges, and other proper appurtenances; and to provide and maintain for the use of all the workmen, proper and sufficient tackle, ropes, blocks, falls or other machinery, needful for raising the bricks, stone, and other materials and things which will be required for the performance of the works; to make good all damage which may be caused to the building or to the materials thereof, new or old, by the insufficiency of the ropes, tackle, ladders, or scaffolding, or by accident in consequence of the performance of the works; and to make good in like manner all damage of every kind which may be caused by the removal and taking away of the scaffolding and the appurtenances thereof.

Take down upper part of tower.

To take down in the most careful manner, without damaging, breaking, or destroying any part thereof, the various materials composing the parapet of the church-tower, the whole of the present bell-chamber or upper story of the tower, and as much of the tower below the bell-chamber as is indicated by the drawings; to take down also the staircase-turret with the steps within the same, as low as the floor of the present bell-chamber, and as much lower as may be requisite in order to remove any rents or settlements therein, yet nevertheless not lower than the general height to which the general walls of the tower are to remain.

To carefully stack up apart and arrange upon the ground the old stone-work, as shall be by the architect directed, in the order in which it will be taken from the building, so that the masons may readily find the old work again for use.

New brick-work and flint-work.

To re-build the whole of the parts of the tower and staircase-turret, herein directed to be taken down, with the most approved new hard grey stock-bricks (without any admixture of soft bricks or other inferior bricks), the whole to be done in the manner of English bond, laid in the closest possible mode, in mortar compounded of one-third by measure of the best (*Dorking*) stone-lime, and two-thirds by measure of clean river sand; the whole of the new brick-work is to be grouted at every alternate course of the work with liquid mortar of the same description; the outside of the work is to be toothed all over 4 inches deep, by the different courses of the work each alternately projecting 4 inches over the course below the same, and is to be filled in flush between the quoin-stones and other external stone-work, with flint-work, as at present, done in the neatest possible manner, with small flints set round the larger flints, in order to render the outer surface of the work more uniform; a piece of strong iron hooping, 2 feet long, dipped in melted pitch, is to be put to every foot superficial of the new work, in order to secure the flints from falling.

Make good walls to new lower windows.

To make good the walls with brick-work to the new lower stone windows.

Repair flint-work.

To repair where defective the old flint-work all round the four sides of the tower, and particularly to the new strings, labels, quoins, and arches; and to provide new flints sufficient for making good any deficiency which may be found in the present flints.

Stop-holes in tower.

To fill up the small apertures at the different sides of the tower with solid brick-work, with flint-work facing thereto.

Cut out, &c., for girders.

To cut out for, and make good with brick-work, the walls of the tower, for the reception of the girders and other timbers of the intended new belfry-floor.

Lime-whiting.

To lime-whiten twice the whole of the interior of the two stories of the tower, intended when re-built to form together the bell-chamber.

½ rod extra brick-work.

To provide under the contract for the works half a rod reduced of the best brick-work, in addition to that which will be requisite fully to complete the intended restoration of the tower, to be used in such extra works as may be by the architect hereafter directed to be done; the value of such of the said extra brick-work as may not be so directed to be used is, however, to be deducted from the amount of the consideration of the contract after the rate of per rod reduced.

Rubbish.

To clear away all rubbish, old chalk, and other useless spare materials of every kind; and to leave the churchyard clear, and make up the same properly after the completion of the work.

Repair damage to roof of church.

To repair all damage which may by the performance of the works occur to the roofing of the church.

MASON.

New stone window-cases to the upper two stories.

To take out all the windows of the story beneath the bell-chamber, and to re-instate, according to the drawings, the whole of the windows of the present upper two stories of the tower with the best hard stone.

Quoin-stones and facings.

To put to the whole of the new part of the tower quoin-stones and other stone-facings according to the drawings, and as nearly like the original work of the old fabric as possible, formed of the present stone of the building (*or of new stone similar thereto*), but entirely re-worked on the beds thereof, and freed from all decay.

New corbel-cornice of stone.

To put all round the four sides of the tower, as shown on the drawings, a new corbel-cornice, to support the projecting parapet, to be double plugged with lead at every joint, and the whole of the said cornice is to be worked according to the profile shown by the drawings.

Coping.

To replace and make complete the coping round the whole of the parapet, with the requisite additional

coping in lieu of those parts of the present coping which may be found defective; the whole to be re-worked, re-jointed, and double plugged with lead at every joint thereof.

Staircase-turret.

To restore the staircase-turret, with the quoins and other stone-work thereof, as nearly as possible like the present building; to re-fix, make complete, and re-work where requisite, those steps which will of necessity be taken down; and to provide and fix 12 new steps of stone in lieu of the most defective or damaged of the present steps. To repair, re-work, and re-fix the loophole-cases to the staircase.

12 new Purbeck steps, &c.

Water-tablings.

To make good the water-tablings where the upper part of the staircase-turret changes in form.

Stone covering to staircase.

To provide and fix a complete covering for the staircase-turret, consisting of one piece of stone, $4\frac{1}{2}$ inches thick, sunk away on the top thereof to the outside $1\frac{1}{2}$ inches down, and with proper tooled and throated edges.

To build in two corbels in each wall of the tower, 12 inches on the face, 10 inches in the wall and 10 inches out of it, and 15 inches in height, in order to receive the new bell-framing.

Repair North-western buttress.

To replace all the quoins of the remainder of the North-west buttress (those which are not quite decayed at the face only excepted) with stone of the average thickness of 8 inches, properly wrought and backed up where requisite, and grouted completely in with either the spare flints or with the large cuttings of the stone.

Water-tables to buttresses.

To put to the whole of the buttresses new fair stone water-tables at every set-off, profiled in front according to the drawings, and lapped at the different beds in a proper manner.

String.

To restore all the decayed parts of the lower moulded string-course by cutting out the old stone to at least 8 inches in depth, and by replacing the same with stone worked of the original profile.

Repairs, &c., to label-mouldings to large west window and entrance-doors.

To cut out in a careful manner to a depth not less than 6 inches, the label-mouldings of the large western window and of the doorway beneath the same; to restore the two label-mouldings as nearly as can be ascertained to the original profile; to face over with fair tooled work the stone-arches above the large window, cutting out and replacing to the depth of at least 8 inches such parts thereof as are too much decayed to be properly re-worked; to replace in a workmanlike manner such stones as are decayed; and to make good the walls up to and around the new labels and other stone-work of the western door and western window, as described to the quoins and strings.

SLATER.

To slate the roof of the tower with the best new strong countess slates, nailed with copper nails, and to leave the same perfect at the completion of the whole of the works, cutting neatly the slates at the hips.

CARPENTER.

Take off roof and two floors.

To take off the present roof and the upper two floors of the tower.

Lower bells, &c.

To take down and lower carefully to the ground the whole of the old bells, with their carriages and other appurtenances, for the use of the bell-founder.

Replace lower floor for bells.

To replace the lowermost of the two floors with two new oak girders, each 20 feet long, and scantling 14 inches by 12 inches; to provide and fix to this floor ten feet cube of new oak, in templets, ties, or other work; to lay upon the girders joists formed of the best of the joists of the two old floors, trimmed for a well-hole, as shown in the plan; and to lay the whole floor with the sound parts of the planking of the two old floors, with the requisite new material of the same description to make up any deficiency: the part of the planking over the well-hole is to be hung as a trap-door, with a pair of very strong wrought-iron hinges, and is to have an iron ring.

(The bell-framing and the re-hanging of the bells will be performed by the bell-founder.)

Centering. To provide and fix ribbed centering for turning the arches of the new windows.

Roof. To replace the roof of the tower, using the present materials as far as the same are sound; to put a new wall-plate of oak scantling 6 inches by 8 inches, four new oak angle ties 6 inches by 8 inches, each 12 feet long, one angle-beam of fir 12 inches by 8 inches and 30 feet long to pass over the angle-ties and receive the end of the vane-staff, and four new hips of 2 inch deal, 10½ inches wide, rounded for lead; to put new rafters of fir 6 inches by 4 inches in lieu of those rafters which are unfit to be again used, and new fir pole-plate 5 inches by 5 inches.

To board the roof with inch yellow deal slate-boarding clear of sap-wood.

To form the gutter round the roof with 1¼ inch yellow deal gutter-board and very strong bearers current 2½ inches in 10 feet, 2½ inches rebated drips in the situations shown by the plan, and with a cess-pool formed at the head of the rain-water-pipe.

Belfry windows. To put to each light of the belfry windows a proper wrought and framed oak window-case, scantling 5 inches by 4 inches, filled in according to the drawings with 1¼ inch wrought and framed oak louvre-boards 8 inches wide.

Doors to turret-stairs. To put to the belfry and to the head of the turret-stairs new oak doors, formed of 1½ inch inside framing, and 1 inch grooved and tongued upright boarding, hung with plain wrought-iron straps and hooks. (The hooks to be run with lead into the jambs.)

SMITH.

2 cwt. ties additional. To provide and fix 224lbs. in addition of wrought-iron straps, ties, and bolts, for such parts of the work as the architect may direct.

Vane. To repair thoroughly the old vane and the standard thereof, and refix the same to the new roof of the tower.

Lightning conductor.

To provide £ (according to the height of the tower) for a lightning conductor, fixed complete.

PLUMBER.

To take off the present lead-work of the tower, and to lay to the new roof thereof cast-lead gutters, weight 7lbs. to the foot superficial, turned up 6 inches high against the parapet and 10 inches next the rafters, and under the slates; to put a flashing of 5lb. milled-lead 6 inches wide all round the gutter; to cover the hips of the roof with 5lb. milled-lead 20 inches wide, laid under the slates; and to put at the summit of the roof a 5lb. milled-lead cap 2 feet 6 inches square; to put from the roof of the tower a stack of new rain-water-pipe 4 inches bore, formed of 10lb. milled-lead, with a strong large ornamental Gothic head and 12 feet of cast-iron pipe at the foot next the ground, and with a proper shoe complete.

GLAZIER.

Glaze the windows below the belfry with strong cathedral glass, in quarries, 5 inches by $3\frac{1}{2}$ inches, in strong leads, tied with copper wire to wrought-iron saddle-bars, $\frac{5}{8}$ inch square, let into the stone-work; the glazing to go well into the stone grooves, and to be cemented up.

PAINTER.

To paint four times with red lead and oil paint the chain-bar, iron-ties, and other new iron-work of the tower; to paint in the like manner the cast-iron lower part of the rain-water-pipe, and the vane and vane-standard; to finish the same once extra in common colour, and to double gild the vane and its metal adjuncts; to paint four times in oil-colour the new louvre-boardings and frames of the belfry, and the doors and frames of the turret staircase.

CHAPTER XXIV.

SPECIFICATION OF WORKS *to be done to the* PARISH CHURCH *of* , *in the county of* , *in the* ADDITION THERETO OF TWO TRANSEPTS AND A CHANCEL *according to the drawings of the architect, and in the performance of certain other alterations to the said church.*

(Insert list of working-drawings.)

BRICKLAYER.

Pulling down, &c. To take down carefully as much of the walls of the church as will require removal in order to carry into execution the intended additions and alterations to the church; to break up, and clear away the present foundations of the walls as far as may be requisite in order that the intended new walls and counter-arches may not bind upon any of the old walling and foundations.

Old materials. To sort carefully all the old brick and stone which will result from pulling down and removing such portions of the church as will so require in order to carry into execution the intended additions and alterations to the church; to clean and to stack up to be again used, such of the old bricks and stone as will remain sound and fit to be again used; and to remove and cart away from the church and from the churchyard

Rubbish, &c. all the useless materials, and also all the rubbish which will from time to time, during the performance of the intended works, accrue in and about the church and the churchyard.

Digging, &c. &c. To dig out, for the foundations of the intended additions to the church, the ground to the depths and widths requisite for the reception of the intended new brick-work; to remove from the foundations and sites of the intended additions all impediments of every kind; to ram down hard and render solid and level the bottoms of all the trenches for the reception of the foundations; and, when the foundations are laid, to fill in and make up the ground to proper levels,

both within and without the building, as shown by the drawings; and to remove and cart away from the church and the churchyard, all the superfluous earth and whatsoever else may be dug out of the foundations.

(A place, if possible, in the church yard should be assigned for the deposition of the spare earth and human remains which are found on digging in a churchyard for any new foundations).

Indents, &c. To cut and parget in the old walling, proper perpendicular indents, chasings, and tongues, in order to receive and to keep steadily the intended new walling; and to repair with sound walling all the shattered or otherwise defective portions of the old walling which will immediately adjoin the intended new work.

Stop up old window. To stop up with new walling-stone set in one-half new quick cement and one-half sand, bonded in regular courses into the old work, the remaining portion of the window-opening which is on the south side of the church adjoining to the intended new transept, and which window will require to be taken away in order to carry into effect the intended additions to the church.

Windows removed. To cut out the wall of the north and south sides of the church near the western end thereof, in order to admit two of the present stone windows in the situations shown by the drawings; and to repair and make good the wall to the same in a careful, sound, and workmanlike manner.

New brick-work. To execute in the most careful and workmanlike manner the intended new walling-work of the intended two new transepts and of the intended new chancel of the church, of the several heights, thicknesses, and forms shown by the drawings, and with arches, counter-arches, piers, reveals, recesses, breaks, and chamfers also, as thereby shown.

Walling. The new walls to be built of the stone from the quarry, carefully carried up in mortar, with through or bond-stones every superficial yard; the face stones to be hammer-dressed and quarry-bedded, and laid in irregular courses.

Ventilation. To provide and fix in the walls for the ventilation under the boarded floors No. cast-iron gratings, according to a pattern to be provided by the architect.

Bedding, &c. To bed and point with mortar the plates, stone-work, and other work, to be set in the walls.

Piers, cross-walls, &c. To put piers of brick-work not more than 3 feet apart, as shown by the drawings, for the support of the sleepers of the wood-flooring; and to put, also, for the support of the steps, cross-walls as shown by the drawings.

Tiling. To strip the present roofing of the church from the east end thereof to about the west sides of the new transepts, and to re-tile the parts of the roofing so stripped, (with the exception of the portions thereof over which the roofs of the transepts will extend,) using again the best of the present tiles, and making good the lathing where requisite.

Bricks. The backing of new walls may be executed of such of the old bricks to be of necessity taken from the present building in order to carry into effect the intended additions and alterations, as may remain, sound, undecayed, and fit in the judgment of the architect, to be again used in the new work.

Mortar. The whole of the new walls (except where herein otherwise directed) is to be laid in and to be entirely flushed up at every course thereof with the best mortar composed of one-third by measure of the best well-burnt lime, and two-thirds by measure of the best sand, well beaten together; and the brick-work is to be thoroughly grouted with liquid mortar at every alternate course thereof.

Tile paving. To pave the transepts, and pave where indicated by a red tint on plan, with Minton's or Maw's 6 inch red, buff, and black paving-tiles, in patterns, set in mortar, on a layer of concrete 5 inches thick.

To pave the chancel, where coloured red on plan, with Minton's or Maw's $4\frac{1}{4}$ inch red, black, buff, and chocolate tiles, one-fourth being glazed, and one-tenth of the remainder encaustic pattern tiles, set and laid in cement. (The proportion is to be given in case the design for the floor has not yet been made.)

Jobbing-work. (See p. 79).

1 rod extra brick-work. (See p. 78).

MASON.

Old windows. To take out carefully and remove from the present walls of the church the east window and the two windows which are opposite each other in the present chancel; to repair thoroughly all the stone-work and iron-work of the said three windows; to re-fix and make complete the present east window in the gable wall of the intended new northern transept; and to re-fix and make complete the other two windows opposite to each other, in the situations shown by the drawings.

New windows. To provide, fix, and make complete in the vestry and in the gable-walls of the new chancel and new south transept, three windows according to the drawings, with sills, jambs, mullions, arches, and label-mouldings of the very best hard stone, wrought and rubbed quite fairly, with strong copper plugs in all the horizontal joints thereof; each window is to have saddle-bars 12 inches apart, and a casement with hinges and fastenings complete, all of galvanized wrought-iron.

Doorway. To put to the chancel-doorway a step scantling 7 inches by 10 inches, and a label-moulding according to the drawings, both of the best hard stone, properly rubbed.

Chancel steps. The steps at the chancel-steps, and in the chancel, to be of stone, 9 inches in the tread, with chamfered nosings and rebated back-joint; the risers to be of 3 inch glazed red and black tiles, set in cement, upon the face of the dwarf walls.

TILER.

(See p. 211).

CARPENTER AND JOINER.

New materials, &c. To provide sufficient new materials for, and frame fix, and finish all carpenter's work and joiner's work

which may be requisite for carrying into effect and for finishing in every respect the intended additions and alterations to the church; and to make all the carpenter's work and joiner's work complete, with all nails, spikes, screws, and other proper ironmongery of the very best quality.

Timber and deal. (See p. 82).

Old materials. All the old timber and wood which will of necessity be taken down and removed in order to carry into effect the intended additions and alterations to the church, may be used in the new work as far as the same shall turn out sound, undecayed, and fit to be again used.

Sundries. (See p. 82).

Iron ties, &c. To provide and fix in and about the intended works 6 cwt. of iron, in such ties, screw-bolts, and other light wrought and hammered work, as the architect may direct.

Hoarding and shoring. To inclose the works while the same are being carried on, by a substantial wooden hoarding 6 feet high, and to remove and take away the same at the completion of the works, or at such time prior thereto as the architect may direct.

Shoring. To provide, fix, maintain, and finally remove when no longer required, such shoring as may be required for the support of the roofing and other parts of the old building as may require support during the carrying on of the intended works.

Centering. To provide, fix, ease when directed, and finally remove, all centering requisite for turning the arches and counter-arches.

Roofs. (See p. 341).

To board under the curved portion of the chancel roof, as shown on the details, with $\frac{3}{4}$ inch boarding, laid close joint to diagonal patterns; and nail under the boarding double chamfered ribs, as shown, with proper mitres.

Fillets on backs of rafters. (See p. 341).

Plates. (See p. 341).

Tilting-fillets. (See p. 342).

Wood floors. (See p. 342).

Chancel and transept seats. (See p. 343, nave seats).

Old floorings. To repair and make good, and complete as far as requisite, and in a substantial and workmanlike manner, the other floorings of the church, at all the parts thereof where the seats, pulpit, and other fittings of the church are intended to be altered or re-arranged.

Belfry-floorings. To construct a floor to the belfry over the intended vestry-room with one trimming-joist 10 inches by 5 inches, one trimming-joist 9 inches by 4 inches, and other joists 9 inches by $2\frac{1}{2}$ inches, and to lay all the same flooring with $1\frac{1}{2}$ inch rough yellow deal clear of sap-wood, and ploughed and cross-tongued.

Pulpit, &c. To take down, repair thoroughly, alter, as shown on the drawings, remove to the situation shown by the drawings, and make complete the pulpit, with the stairs, steps, and all the other fittings thereof.

Altar. To re-fix and make good the present altar rails, where shown on the plans.

Chancel door. (See p. 342).

PLASTERER.

Stucco work. To execute in the best floated and troweled stucco all the new internal walls.

To lath, plaster, float, and set, between the rafters of the transept roofs.

PLUMBER.

(See p. 344).

GLAZIER.

Old glazing. To re-glaze the two windows intended to be placed at the western part of the church, and the window in-

tended to be placed in the new northern transept. using for the same the present glass which will remain sound and unbroken, and providing new glass similar to the present glass sufficient for making up all deficiency.

New glazing.

To glaze the windows of the new chancel, new southern transept, and intended vestry-room, with the best new cathedral glass. (See p. 344).

Lead-work, &c.

The glass of all the six windows above described is to be set in strong church lead-work, and is to be secured to the saddle-bars by sufficient strong copper bands.

PAINTER AND STAINER.

Four times in oil to iron-work and exterior wood-work.

To scrape from rust, prepare properly, and paint four times with the best oil colour all exterior deal work, the saddle-bars, and other iron-work of the windows, and other new parts and altered parts of the church and of its appurtenances, the first two coats of colour being red-lead paint to all iron-work.

To stain with two coats of oak stain all the interior wood-work exposed to view, and twice varnish the seats.

CHAPTER XXV.

SPECIFICATION FOR WORKS *to be done in the erection and entire completion, fit for occupation, of* SCHOOL *and* HOUSE, *on a plot of land situate , Mr. architect, and for fencing in the plot of land, making up the play-ground, and for the performance of other consequent works.*

GROUND-WORKMAN AND BRICKLAYER.

Notice to the district-surveyor.

To give to the district-surveyor the requisite notice, and pay to him his proper official fees.

Digging, &c.

To prepare the whole ground-plot under the intended buildings, by levelling the earth all over the same to a regular horizontal platform, and by removing so much of the ground from under the boarded-floors as will be found requisite on account of the inclined and uneven surface of the ground over which the buildings are to stand.

To dig out the ground for all the foundations, drains, cess-pools, posts, and wherever else may be requisite in order to execute and complete the design of the buildings, and the works of every kind. To render level and hard the bottoms of all the trenches, and to fill in and consolidate properly the ground about all the footings, brick-work, drains, cess-pools, and other works, when executed. *Note.*—The ground is not to rise beneath the timber ground-floors higher than 12 inches below the under-sides of the joists.

Rubbish.

To remove from the buildings from time to time, as the same may accrue, all rubbish of every kind which will result from the execution of all the various works intended to be done; and to dispose of the same in making up the substratum of the intended walks and other gravelled surfaces; and, when the gravel-work is done, to remove and cart away all remaining rubbish of every kind, and to leave finally the entire premises clear therefrom.

Making up of ground.

To perform all ground-work requisite in order to prepare the whole surface of the plot of land lying behind the intended buildings for a play-ground, and also for the preparation of a pathway, 6 feet wide, from the front fence up to the principal front entrance of the buildings, and a pathway, 4 feet wide, all along next the entire principal front of the buildings, and the two pathways or alleys at the ends of the buildings, all which ground-work is to be completed by consolidating the soil in a proper manner, and by altering and rendering uniform the whole thereof, spreading, to form part of the sub-base, the superfluous ground resulting from the digging directed by this specification to be done, and applying such other labour in and about the work as from the nature thereof may be requisite in order to render the same complete.

Gravel-work.

To finish the entire superficial extent of the play-ground, and of all the pathways mentioned above, by providing and spreading over every part thereof a complete stratum of the very best coarse stone ballast, full 4 inches in depth, and a complete upper stratum of the very best binding garden-gravel, full 3 inches in depth; all which gravel-work is to be beaten down and is to be rolled over and consolidated in every part thereof, and is to be left hard and perfect immediately prior to the payment of the final balance to become due to the contractor on account of the works to be performed by him.

Well.

To dig, stein round with hard grey stock-bricks, and make in every respect complete, in the situation shown by the drawings, a well, 3 feet 6 inches internal diameter, and 30 feet deep, and to dome over the same with 9 inch brick-work laid in mortar. (*If the well be required deeper, an agreement should be made for each foot of the extra depth, with steining complete.*)

Cess-pool.

To form a cess-pool in the situation shown by the drawings, 6 feet internal diameter, 8 feet deep, and steined round with dry stock brick-work 4 inches thick.

Drains, &c.

(See p. 77).

General brick-work.

To execute in the very best, most careful, and accurate manner, all brick-work requisite for carrying into effect the design of the buildings and their ap-

purtenances, according to the drawings, and to render the whole premises complete and finished in every respect.

Arches. To turn arches over all the internal openings, as shown by the drawings, and where otherwise may be requisite for the proper construction of the buildings, more particularly to such parts of the chimneys as so require, in order to carry into effect and to complete properly the buildings, according to the drawings.

To execute, according to the drawings, all the external arches in gauged-work of bricks, cut, rubbed, and set in the closest possible manner.

Windows. To form all the windows in the neatest possible manner in brick-work, as shown by the drawings; the windows are to have saddle-bars at the situations shown by the drawings, composed of wrought-iron $\frac{1}{4}$ inch by $\frac{1}{2}$ inch, and extending at each end 6 inches into the jamb; the mullions and arches are also to have grooves cut out all round $\frac{1}{4}$ inch square, in order to receive the glazing. To cement all round all the lights when fixed by the glazier.

Facings. To face with the very best square bricks, jointed in the neatest possible manner, every part of the external brick-work of the whole of the buildings of every kind, including all the returns, jambs, reveals, and other appurtenances thereof.

Chimneys. To properly turn, parget, and core all the flues; to put to the fire-places of the school-room and kitchen wrought-iron chimney-bars $\frac{1}{2}$ inch by $2\frac{1}{2}$ inches; and to put to each of the other fire-places wrought-iron chimney-bars $\frac{3}{8}$ inch by 2 inches: the chimneys are to be arched over so as to ascend in the most gentle manner possible, and issue with octagonal turret-shafts $13\frac{1}{2}$ inches internal diameter at the four angles of the tower: to put for the support of the slabs of the fire-places to the school-room and the ground-floor-rooms brick fenders 4 inches thick and 12 inches high; and to put to the fire-place of the chamber a 4 inch brick-trimmer 12 inches longer than the chimney-opening.

Ventilators, air-flues, and openings. To form round the walls, in the situations shown by the drawings, air-flues with openings to ventilate

the ground-floors and the school-room, and to provide, bed, and fix to the upper air-flues No. 15 cast-iron valves, and No. 13 cast-iron gothic ornamental gratings, according to the drawings.

Bedding, &c. To bed in mortar all the plates, lintels, wood-bricks, templets, and other timbers and work so requiring; to bed and point round with lime-and-hair mortar all the door-frames and window-frames; and to back up with solid brick-work to all the timbers, stone-work, and other things to be set in the brick-work.

Splays, &c. To cut and rub, in the neatest and most workmanlike manner, splays wherever shown by the drawings to the angles of the buttresses, window-jambs, door-jambs, and other parts of the buildings; and to finish the splays with moulded heads in brick-work where the same are not intended to be finished with stone, the outside splays of windows, sills, and heads, the plinth course, and other moulded and splayed work to be executed in moulded bricks, made from detail drawings, which will be supplied.

Brick piers, &c. To build for the support of the sleepers to the ground-floors brick-piers 9 inches by 4 inches, two courses high, and not more than 3 feet apart, and to build under the staircase partition a 4 inch cross-wall 3 courses high.

Brick-paving. To pave with hard square bricks laid flat in mortar, and grouted with mortar between the joints, the whole of the entrance-porch, the scullery, or kitchen, and the room for cloaks, and the two yards to the privies; the paving of the lobby is to be laid in manner of herring-bone.

Filleting to roofs. To form round all the roofs which gable or otherwise abut against brick-work, filleting by setting the bricks in as neat a manner as possible to jet out $1\frac{1}{2}$ inch over the slating, and to fill in between the brick filleting and the slating with good cement.

One rod extra brick-work. (See p. 78).

Bricks. (See p. 78).

Mortar. (See p. 78).

Mode of doing the work. (See p. 78).

Tile-paving. Pave the cloak-room, porch, passages, and scullery, with 6 inch red paving-tiles, set and laid in mortar, and grouted upon a bed of concrete 5 inches thick.

Lime-whiting. To finish completely, fairly, and to lime-whiten twice, every part of the interior work of the school-room, of the scullery, of the entrance-porch, and of all the closets and privies.

Scaffolding. To provide, maintain, alter as occasion may require, and finally remove all scaffolding requisite for the performance of the whole of the works of every kind of the intended buildings and of their appurtenances, with sufficient poles, cords, ropes, wedges, planks, ladders, tackle, and all other proper things necessary thereto.

MASON.

Steps. To put to each of the five external doorways of the buildings a solid Yorkshire stone step 7 inches by 12 inches, properly back-jointed.

Sink. To provide and fix in the scullery or kitchen a 6 inch Yorkshire stone sink 2 feet 6 inches long and 2 feet wide, cut out in order to receive the pipe and grating. (See also p. 81).

Chimney-pieces, &c. To put to the fire-places of the living-room and chamber, jambs, mantles, and shelves of Portland stone, each $1\frac{1}{4}$ inch thick and 5 inches wide.

To put to each of the fire-places, except that to the kitchen or scullery, a slab of rubbed Yorkshire stone full $2\frac{1}{2}$ inches thick, 12 inches longer than the opening, and 18 inches wide; and to put to each of the same 3 fire-places a hearth of $2\frac{1}{2}$ inch rubbed Yorkshire stone.

SLATER.

Countess slating. To slate the whole of the roofs of the intended buildings with the very best strong countess slates.

Nails, bond, &c. The whole of the slating is to be fixed with strong copper (or zinc) nails, and is to have proper bond in every part thereof, particularly at the heading courses, with cut slates, instead of, as in the more usual mode, slates laid lengthwise with narrow slips of slate between them.

Ridge tiles. (See p. 211).

Reparation. (See p. 211).

CARPENTER AND JOINER.

New materials, &c. To provide sufficient new materials for, and frame, fix, and finish all carpenter's work and joiner's work (complete with all proper ironmongery of the very best quality) which may be requisite for carrying into effect and for finishing in every respect the school and its appurtenances according to the design.

Timber and deal. (See p. 82).

Sundries. The rafters of all roofs are not to be more than 12 inches apart; none of the joists, ceiling-joists, and the other rafters, are to be more than 12 inches apart.

To provide and fix all requisite shores, struts, puncheons, oak wedges, ties, cletes, beads, stops, fillets, tilting-fillets, backings, blocks, linings, casings, furrings, and rolls, and all moulds, rods, and patterns requisite for setting out and executing accurately all the various works: to provide 168lbs. avoirdupois of wrought-iron in such straps, ties, and bolts, as may be directed, in addition to the iron-work elsewhere herein described; and to fix all the iron-work. To perform such rebating, grooving, tonguing, beading, scribing, chamfering, housing, jointing, mortising, framing, dove-tailing, planing, and other work and labour, as may be found requisite for the perfect performance of, and the thorough completion of, the whole of the buildings and the fittings and appurtenances thereof.

Centering. To provide, fix, ease when so directed, and finally remove, all centering and turning pieces requisite for the trimmers and arches of every kind.

Casing to stone-work.

To case up all the angles of the brick-work in manner sufficient to preserve the same from injury during the carrying on of the works of the buildings.

Lintels.

To put over the windows and doorways of the house, fir wrought and chamfered lintels, scantling 3 inches high, and 18 inches longer than the openings.

Ground-floors.

To construct the floors to the school-room, to the class-room, and to the closets thereto attached, with fir joists $2\frac{1}{4}$ inches by 4 inches, upon oak sleepers 4 inches by 3 inches; and to lay the whole of the joists with $1\frac{1}{4}$ inch yellow deal listed free from sap-wood, the boarded flooring of the living-room being wrought all over.

Roofs.

(See p. 310).

Plates.

(See p. 310).

Bell-turret.

To construct the bell-turret according to the drawings and of the scantlings marked thereon.

Gallery on the ground-story.

To construct the gallery in the school-room as shown by the drawings, with joists 7 inches by 2 inches, bracketed with $1\frac{1}{2}$ inch gusset-pieces, laid with $1\frac{1}{4}$ inch yellow deal wrought, and with inch yellow deal risers; to inclose the end next the passage with $1\frac{1}{4}$ inch deal spandril square framing, raking 2 feet high above the seats, finished with beaded capping on the top, and to put in the same partition $1\frac{1}{4}$ inch square, framed door, hung with hinges, a bolt, and stops complete.

Skirting.

To skirt the living-room and the chamber with $\frac{3}{4}$ inch yellow deal 5 inches high, plugged to the walls.

Angle-staves.

To put to the chimney-front of the chamber proper rebated angle-staves.

Partitions.

To inclose the staircase and all the closets with 2 inch deal square-framed partitions, with $\frac{3}{4}$ inch deal panels not more than 10 inches wide, and to put round all the doorways therein beaded and chamfered door-steps.

House windows.

To fit up the windows of the house with solid fir proper frames 5 inches by 4 inches, with an oak sunk and weathered sill 4 inches by 3 inches, and to

put thereto 2 inch chamfered bar sashes, with a pair of French casements, hung to open outwardly with 2 pairs of 3 inch butt-hinges, and with other ironmongery value 10*s*., and with all requisite beads, stops, and grounds.

To put to the window of the scullery a deal-cased frame with oak sunk sill and $1\frac{1}{2}$ inch chamfered-bar sashes-spring double hung with patent lines, iron axle-pulleys, iron weights, and a patent fastening.

Doors.

To put to the living-room, to the chamber, to the school-room, and to the room for cloaks, five 2 inch four-panel square-framed doors, hung each with a pair of 3 inch butt-hinges and with other ironmongery to each value 10*s*., including the fixing.

To put to each of the closets a four-panel $1\frac{1}{4}$ inch square-framed door, hung with a pair of 3 inch butt-hinges, and with other ironmongery value 5*s*., including the fixing thereof.

To put to the scullery or kitchen two $\frac{3}{4}$ inch wrought, ploughed, tongued, beaded, and ledged doors, hung each with a pair of 18 inch cross garnet hinges, two 9 inch rough rod bolts, and a Norfolk thumb-latch.

To put to the two external doorways of the school-room 2 inch deal bead-flush and square-framed sashed doors, according to the drawings, hung each with a pair of $3\frac{1}{2}$ inch butt-hinges, two 9 inch rough rod bolts, and a Norfolk thumb-latch.

Door-cases, linings, &c.

To put to the four single doors of the school-room, and the two doors of the scullery or kitchen, fir wrought framed and chamfered door-cases, 5 inches by 4 inches tenoned at bottom with a piece of 4lb. milled-lead 16 inches square, wrapped round the foot of each external door-post, and nailed at the top thereof with copper nails, the two external door-cases of the school-room to have wrought framed and chamfered transoms, and $1\frac{1}{2}$ inch yellow deal fanlights hung vertically upon centres, and fitted up properly with mitred beads on both sides.

To put to the doors of the living-rooms $1\frac{1}{4}$ inch square-framed single rebated and chamfered jamb-

linings and soffit, framed in seven panels to match the doors.

Staircase.

To construct the staircase, as shown by the drawings, with $1\frac{1}{4}$ inch yellow deal, wrought treads and risers, housed into $1\frac{1}{2}$ inch yellow deal string-boards, framed and turned newels $3\frac{1}{2}$ inches by $3\frac{1}{2}$ inches, bar-balusters $1\frac{1}{8}$ inch square, deal moulded hand-rail with mitred cap, $\frac{3}{4}$ inch deal apron-linings, and all requisite blocks and other fittings.

Closets.

To put in the closets 50 feet superficial of inch deal shelving, fixed on proper bearers.

Privies.

To fit up the three privies according to the drawings, wall-plates $4\frac{1}{4}$ inches by $2\frac{1}{2}$ inches, rafters 3 inches by 2 inches, ridge 1 inch by $4\frac{1}{2}$ inches, slate-battens $\frac{3}{4}$ inch by 2 inches, five fir proper door-cases $4\frac{1}{2}$ inches by $4\frac{1}{2}$ inches, three doors of $\frac{3}{4}$ inch deal, wrought, ploughed, tongued, beaded, and ledged and hung with strong hinges, and with other ironmongery value 20*s.*; floors of inch yellow deal upon fir bearers 4 inches by 2 inches, inch deal seats and risers, with proper fittings and bearers.

Earth closets.

(If earth closets are required, see p. 396).

Fences, &c.

To enclose the west-side of the ground from the front to the kitchen or scullery, and from thence quite back to the north-west corner of the ground, by an oak cleft fence, 4 feet 6 inches high, securely fixed to two arris-rails, cut diagonally out of fir 4 inches by 3 inches, and framed into oak posts, not more than 8 feet apart, pitched at the bottom, scantling $4\frac{1}{2}$ inches by $3\frac{1}{2}$ inches, length 7 feet 6 inches, and each post secured by two spurs of oak pitched all over, scantling 3 inches by 3 inches, and 4 feet long.

To put to the front of the ground a gate 3 feet wide, to correspond with the oak cleft fence, ledged and braced at the back, fitted up and hung with strong hinges, a latch, and other fittings complete, to two oak posts with two oak spurs similar to the posts and spurs described to the intended new fence.

Jobbing-work.

(See p. 103).

PLASTERER.

Lath, plaster, set, and whiten.

To lath, plaster, set, and whiten ceilings to the house, and under the rafters and ashlaring pieces of the school, class-room, porch, and cloak-room.

Render, set, and colour. To render, set, and colour the internal brick-work of the room of the house.

Arrises, &c. To run and execute all requisite beads and quirks, and form all necessary arrises.

PLUMBER.

Pump. To provide and fix in the scullery or kitchen, with all proper apparatus and appurtenances complete, a 3 inch iron pump with strong lead suction-pipe, suitable for a well 28 feet deep.

Gutters. To lay the gutters with lead, weight 6lbs. to the foot superficial, turned up 12 inches at each side.

Rain-water-pipes. To provide and fix four complete stacks of cast-iron rain-water-pipes, each $3\frac{1}{2}$ inches bore, extending from the guttering, and with heads and shoes complete.

Eaves'-guttering. To provide and fix at all the projecting eaves 4 inch cast-iron eaves'-guttering, securely fixed upon strong wrought-iron brackets, and put together with red lead.

Dormer. To put all round the four sides of the dormer flashings of 4lb. milled-lead, 12 inches average width.

Urinals. (See p. 297).

Lavatory. (See p. 105).

Casements. Provide one to each side window, and two to each gable window of school and class-room, a wrought-iron swing casement the full width of the light, and with proper cords, pulleys, and racks complete.

Provide to each window of house cast-iron casements, hung with hinges, to open outwards, with latch and stay-bar complete.

PAINTER.

Four times in oil to iron-work. To paint four times with the best oil colour the whole of the iron-work of the intended buildings, the first two coats of colour being red-lead paint, and the last coat of paint being stone colour.

Four times in oil. To knot, stop, prepare properly, and paint four times with the best oil colour, the whole of the woodworks of the intended buildings.

GLAZIER.

Second-glass in sashes, &c. To glaze all the windows and the sashed doors with good second Newcastle crown glass, properly bedded, bradded, and back-puttied.

Cleaning, &c. To clean, repair, and leave perfect, all the glazing of the buildings, at the final rendering up of the same as complete.

CHAPTER XXV.

SPECIFICATION *of the works required to be done in building* NEW SCHOOLS *and* MASTER'S HOUSE *at* , *in the county of* , *and the diocese of* , *from the designs and under the superintendence of architect, of* .

EXCAVATOR AND BRICKLAYER.

Dig out the ground to the depth and width required for laying in the concrete for the footings of the several walls shown upon the drawings, and properly level the whole of the area within the walls of the entire building, filling in with hard brick rubbish those portions of the buildings hereafter described to be paved.

Excavate the ground to the required depth for the main cess-pool, the soil-pits under the privies, and for laying in the several drains.

Properly ram the earth against all walls, drains, cess-pool, &c., and execute all levelling, filling in, ramming, digging, and other ground-work.

Superfluous earth. Remove and cart away to where directed all superfluous soil and rubbish, from time to time, and at the completion of the works.

Concrete. If concrete be required under the walls, it is to be composed of clean washed gravel or shingle, mixed in the proportion of 1 part of lime and 6 parts gravel, to be thrown into the trenches hot, and levelled to receive the footings of the several walls; and the contractor is to state in his tender the price per yard cube at which he will form it into the trenches.

Cess-pool. A main cess-pool to be constructed (of the size shown on the drawings), 8 feet in diameter and 7 feet deep, to have a man-hole, 2 feet diameter, with a 3 inch stone cover, within 3 inches of the surface of ground, to be steined round in $4\frac{1}{2}$ inch brick-work, and

domed over, and lined with 9 inch brick-work, and all rendered in cement. Construct soil-pits for privies, and render in cement.

Well. Sink a well, 20 feet deep steined in $4\frac{1}{2}$ inch brick-work, and domed over with man-hole and cover, similar to cess-pool.

Drains. The whole of the drains to be glazed earthenware tubular drains, and laid with a fall of not less than $1\frac{1}{2}$ inches in 10 feet. The soil-drains to be 6 inches in diameter, and the rain-water-drains 4 inches in diameter, each junction to be trapped.

Footings. The footings to all walls, and the inside walls, and inside face of walls, to be built with new sound hard well-burnt bricks.

Facings. The external walls above the ground-line to be faced with best stocks and red stock bands and strings; all plinth courses, jambs of doors and windows, and window-sills, strings, and chimney-cappings to be in Moulded bricks. red moulded bricks, and all to be of approved colour and quality, and according to full-size detail drawings which will be furnished.

External walls. The external walls to be built with a cavity of 2 inches, tied together every third course with headers 2 feet 3 inches apart, breaking joint. (See also p. 280).

Mortar. Mortar to be composed of stone-lime and clean sharp sand, in the proportion of 1 part of lime to 2 of sand. All cement to be of the best quality.

Courses in cement. The top courses of walls, brick copings, sills, and chimney-cappings, to be all set in cement.

Dwarf walls. Build all dwarf-walls, trimmer-arches, &c.; build Gratings. in No. 8 gratings, for ventilation under boarded floors, set all grates, copper, &c., and perform all other necessary bricklayer's works.

Privies. Provide and fix to privies No. 5 earthenware glazed pans, with a straight length from each to dip into soil-pits.

Urinals. (See p. 401).

Copings. Coping of yard walls to be moulded saddle-back, set in cement.

Paving. Pave the cloak-rooms, scullery, and passage, with 6 inch red paving-tiles, laid diagonally in mortar upon a 4 inch bed of concrete.

Arches. The arches and heads of doors and windows to be executed in gauged work, neatly set in mortar.

Pointing. The joints to be neatly struck, as the work proceeds, with a flat joint, and dashed with sand.

Flues. Properly form, parget, and core all flues.

MASON.

All stone used to be of the best quality, free from shakes, flaws, or vents, and all other defects.

Bath stone. The jambs, sills, mullions, and heads of all windows, to be of Box ground Bath stone, the whole to be properly worked, set, and bedded and bonded into the walls, and finished according to the drawings.

Paving. Pave the privies and urinal with 2 inch tooled York paving, bedded in mortar, on solid foundation. The urinal to be paved with a fall into a channel stone, for drainage into the soil-pit.

Steps. Properly fix at the doorways and entrances solid rubbed York steps, 6 inches thick and 9 inches tread, and pinned into the walls 3 inches on each side, to be properly cut and prepared to receive door-frames.

Chimney-pieces. Provide and fix chimney-pieces—in school-room, value £2; class-room, master's sitting-room, £1 each; other rooms, 15*s.* each; these prices not to include fixing, which is to be done by the contractor.

Hearths. Provide and fix to all fire-places York stone hearths and slabs.

Sink. Properly pin into walls of scullery a 6 inch York stone sink, of the size shown on ground-plan, with hole for bell-trap, and lead waste-pipe to drain.

Generally Cut all requisite grooves, rebates, chases, holes, back-joints, fair edges, and perform all other necessary and usual mason's work; clean off and leave perfect.

CARPENTER.

The timbers to be all Memel, Riga, or Dantzic fir; the deals yellow Christiana or Archangel; oak to be English. All to be dry and well-seasoned, and free from shakes, sap, or dead knots, or other defect.

Roofs. The roofs to be constructed according to drawings, and all timbers to measure the full scantlings specified thereon when fixed in their places. No joists or rafters to be more than 12 inches apart. The plates, purlins, and ridges, to be in as long lengths as possible, and well scarped and secured at the junctions.

The timbers of the school and class-room to be wrought where exposed to view.

Bell-turret. The bell-turret to be worked to a detail drawing, to be of seasoned fir, and properly bolted and secured to the roof-timbers and trimmer-pieces.

Lintels. The internal doorways of house, and the windows, to have fir lintels 3 inches thick, the width of walls, and 12 inches longer than openings.

Wood-bricks. Build in all wood-bricks, and secure all necessary grounds for plastering, &c.

Wood floors. The school-room and class-room floors to be laid with $1\frac{1}{4}$ inch yellow deal straight-jointed floor, upon joists 5 inches by $2\frac{1}{4}$ inches, and oak sleepers 4 inches by 3 inches.

Wood block do. (See p. 395).

The floors of house to be laid with 1 inch deal straight-jointed floor; ground-floor joists 5 inches by $2\frac{1}{4}$ inches; bed-room-floor joists 8 inches by $2\frac{1}{4}$ inches. Skirtings to all rooms and passages of house $\frac{3}{4}$ inch chamfered, 6 inches high, on proper grounds.

External and school-doors. The external and school-doors to be framed with 2 inch stiles, rail, and heads, and $\frac{3}{4}$ inch oak upright boarding, grooved and tongued, and $1\frac{1}{4}$ inch middle rail and braces, hung to 5 inch by 4 inch rebated door-frames, wrought and chamfered, and tenoned into stone steps.

Internal house-doors.

Inside house-doors to be 4 panel square $1\frac{1}{2}$ inch doors, with edges of stiles and rails chamfered off, hung to $1\frac{1}{4}$ inch rebated jamb-linings, and stops nailed, the linings to project before the face of plastering 1 inch, and chamfered.

Privy and office-doors.

Privy and office-doors to be 1 inch braced and ledged doors.

Staircase.

The staircase of master's house to have steps of $1\frac{1}{4}$ inch deal, with rounded nosings and inch deal risers, to be properly glued and blocked, and housed into $1\frac{1}{2}$ inch deal, framed outside wall-string, with moulded capping, and beaded under edge, and $1\frac{1}{4}$ inch raking-string, with proper ramps to the winders. The winders to be cross-tongued and glued at the joints, and each step to be properly bracketed to receive the lath and plaster, 3 inch turned newels, moulded hand-rail, turned and mitred caps, turned pendants, $\frac{3}{4}$ inch square bar-balusters. The hand-rail and balusters to be continued round the well-hole of landing with $\frac{3}{4}$ inch beaded fascia to the well-hole, and rounded nosing to ditto.

Privy and office roofs, &c.

Provide and fix the timber to carry roofs of privies and offices. The seats and risers of privies to be of inch deal with rounded nosings, and $\frac{3}{4}$ inch risers of slate; all to be fixed on proper bearers.

Seats.

Provide the sum of £15 for seats and desks, and gallery.

Dresser.

Provide and fix a dresser in kitchen, 4 feet 6 inches long, with 2 drawers and pot-board under, and 3 tiers of plate-shelves and standard. Provide and fix in each room one cupboard front, 6 feet high, with 3 tiers of shelves, on proper bearers.

Centering.

Provide and fix all centering, trimming, and turning-pieces, all blocks and wood-bricks, all plates, templates, blockings, fillets, stops, bearers, hedgings, firrings, &c.; and whatever may be necessary to complete carpenter's and joiner's work.

Sundries.

No joists, plates, rafters, or other wood-work, to be fixed in the walls nearer than 12 inches to any flue; and in all cases where framing is trimmed for hearths

or flues, the trimming-pieces to be ½ inch thicker than the other joists or rafters.

House-windows. The jamb-linings of house-windows to be finished with plain 1 inch linings, similar to the doors; the kitchen and living-room-windows to have 1 inch square-framed shutters, hung to linings, and folding back to walls.

TILER AND SLATER.

Tiler. Cover the roofs with the best plain red (or brinded) roofing-tiles, fixed with oak pins, two to each tile, to fir double tile-laths, nailed on the back of the rafters, and all laid to proper lap.

Slater. Cover the bell-turret with green Welsh countess slates, cut neatly at the hips and laid on slating battens, secured and nailed with 2 copper nails. All eaves to be laid double.

Ridge-tiles. Cover the ridges with red ridge-tiles, of simple approved pattern, set in cement.

Provide Cooper's hip-knob, p. c, 15*s*., to hip in house-roof, and set in cement.

Cisterns. Fix in scullery and over privies cisterns to hold each 250 gallons of water, made of inch Bangor slate; sides and bottom to be jointed together in the most approved manner, and properly secured with iron rod-bolts. Each cistern to have the necessary brass-work securely fastened to the slate bottom, to which service and waste-pipes may be soldered. (See also p. 105).

PLASTERER.

Render, set the interior of school-room and class-room, and house-walls; lath, lay, and set partitions.

Lath, lay, set, and whiten ceilings and underside of stairs, and underside of roof-rafters of school and class-room.

Form a flush skirting 2 feet high, in cement, to walls of school and class-room.

Stop and lime-colour walls, scullery, and master's privy.

Lime-white school privies.

The school cloak-room interior walls not to be plastered, but to be finished and built same as exterior face-walls.

PLUMBER.

Turret. Cover the lower part of turret with 5lb. lead, with solid angles, and stepped under tile-roofs; the lead to cover the bottom of opening in turret, and laid to a weathering.

Flashing Step flashing, 9 inches wide, to all chimneys, rising from roofs; and 9 inch valleys to all roofs of 5lb. lead.

Pump. Provide and fix in scullery a force-pump from well, and service-pipe to supply the cisterns, with proper warning-pipe, a $\frac{3}{4}$ inch service to sink, and from privy-cistern two 1 inch service-pipes to each privy, and moveable key to flush the closets.

Grating. Solder down in sink an iron grating and bell-trap, with $2\frac{1}{2}$ inch waste-pipe, trapped.

Lavatory. (See p. 400).

PAINTER.

Paint the whole of the wood and iron-work exposed to view in four coats of oil colour, the last to choice.

All iron-work to be painted twice before fixing and twice after.

GLAZIER.

All the windows to be glazed with Newcastle crown glass in squares average 12 inches super, divided by wood muntins 2 inches by $1\frac{1}{2}$ inch, ovolo moulded mitring work, to be pullied and back pullied, jambs and mullions; all glazing to be carefully let into grooves, and run with flush cement fillet both sides, when let into stonework or woodwork.

SMITH.

Hinges and door furniture. Provide the sum of 15*s.* each for hinges to front and two entrance-doors of schools; other outside doors to be hung with strong butts; provide to each strong handles, latches and escutcheons, and stock-lock.

The doors of privies and offices to be hung with 12 inch cross-garnet hinges and good thumb-latch to each.

Yard gates to have two bolts each and latch; and outside doors of house also to have latch.

Eaves'-guttering. Provide and fix 4 inch half-round eaves spouting to all eaves with rain-water-pipes, 4 inches diameter; for positions of pipes see plans; all to have necessary bracketing and hold-fasts, and connection with drains.

Casements. Fix proper hinged cast-iron casements, the full width of one light, and half the length to fall back into room, one to each window of school and class-room, with proper lines and pulleys, and hold-fasts; fix to each window of house cast-iron casements, hung with hinges, to open outwards, with latch and stay-bar to each.

Iron-work to roofs. Provide all iron bolts and straps for roofs.

Vane. Provide the sum of £2 10*s.* for vane at top of turret.

Copper. Provide a copper in scullery to hold 30 gallons, complete with setting.

Set in kitchen a cottage range and oven complete.

Stoves and ranges. Provide stoves, value £1 5*s.*, to parlour, class-room, and school-room; and to bed-rooms, stoves, value 15*s.* 0*d.* each.

CHAPTER XXVI.

SPECIFICATION OF THE WORKS *required to be done in altering, repairing, and erecting certain farm buildings at , in the county of , from the designs and under the superintendence of , architects, of .*

BRICKLAYER.

Pulling down. The whole of the thatch to be removed from the roofs of the barns, sheds, and other buildings, and the boarding stripped off the frame-work; and the whole of the buildings, except the large barn, the present cart-horse stable, granary, and nag-stable, to be pulled down, the materials being cleaned, and all that are sound to be stacked for re-use, as will be hereafter described.

Dig trenches for foundations to all walls to the necessary depths and of the necessary widths, and well ram the bottoms, and against footings dig all trenches, and ram for all drains, tanks, and cess-pools, and spread the superfluous soil where directed, and leave the site properly trimmed up.

New walls. The whole of the walls, fence-walls, and dwarf-walls, coloured pink on the plans and sections, to be built with proper footings, formed with large flat bedded stones, of the depths and widths shown, or of such further depths necessary to procure a good and sufficient foundation.

The walls to be built in rubble stone masonry in mortar, with brick quoins to all angles, and at all openings; three courses of brick in mortar on the top of all dwarf-walls, under the timber framing, and saddle-back brick copings on the top of all fence-walls, laid in cement, and properly tied with wrought-iron knees at all openings, 2 feet long, of three-quarter inch by three-sixteenths of an inch.

Walling. The whole of the stones and bricks from the old building, that are sound, to be re-used in the new

work; and any new that are required to be of similar kind and quality to the old. The contractor will be allowed to use sound hard stock-bricks, instead of stone, to make up the deficiency to all walls shown, 1 foot 3 inches thick; in which case they are to be built in brick-and-a-half work, in mortar, in old English bond, and finished with a neat flat point; walls shown 9 inches thick on the plans to be of brick in any case.

Mortar. Mortar to be composed of the best fresh stone-lime and clean sharp river sand, in the proportion of three of sand to one of lime.

Drains. Lay to a proper fall, where indicated by red lines on the plan, to the manure tank, 6 inch and 9 inch socket-jointed drain-pipes, trapped at junctions, and with all proper bends. Lay to a proper fall, where indicated by blue lines, 4 inch and 6 inch rain-water socket-jointed drain-pipes to the rain-water-tank; provide for overflow drains from the two tanks. The manure and soil-drains to be laid in such manner that they shall in all cases (especially in crossings) be 18 inches below the rain-water drains.

Tanks. Form the manure and rain-water-tanks where shown on plan; the manure-tank to be 10 feet, the rain-water-tank 12 feet inside diameter, and both to be 8 feet deep, formed of brick; the sides and bottom to be in two half-brick rims, set in cement, and the top domed over with 9 inch arch; an opening being formed at the crown for man-hole, with York stone cover and ring complete, for removal when required.

Cess-pool. Form a small cess-pool, 4 feet diameter and 5 feet deep, where shown on plan, constructed in every way similar to the other tanks.

Paving. Pave the whole of the several sheds, stabling, &c., where tinted blue on plan, with rubble pitch paving, using the old where possible, and providing new of the same kind and quality; the whole to be laid on a bed of sand, gravel, or breeze, 6 inches thick, well rammed to the various levels, and falls to drains.

Asphalte. The floor of cartway to barn to be covered with the best asphalte flooring, 1 inch thick, laid to fall towards the doorways, both sides, on a bed of concrete 5 inches thick, and a layer of fine stuff 1 inch

thick, floated over to receive the asphalte; the other portion of the barn-floor to be covered with 6 inch concrete, properly floated on top to a level surface.

Concrete. Concrete in all cases to be composed of clean sharp ballast or gravel, and mixed in the proportion of one of lime to six of ballast or gravel, mixed and levelled whilst hot.

Cart-shed. The floor of cart-shed to be covered with gravel, 9 inches thick, laid upon a proper foundation of faggots, which will be supplied.

Plinths. Build in hard stone plinths to posts supporting open sheds; they are to be mortised for stub tenons, and worked with a camber; and the arrises rubbed off as shown on drawings.

Dwarf-walls. Repair the old dwarf-walls to barn, cart-stable, and fence-wall, at back of new cow-house, leaving all perfect and complete.

Thresholds. Provide 3 inch flush tooled York thresholds, the full thickness of walls, and 12 inches longer than openings to all doorways; gateways and other openings carefully laid and bedded in concrete.

Sink-stones. Provide 3 inch thick York sink-stones where described and shown in plans, rebated fir cast-iron 9 inch gratings and frame; the gratings are to be moveable, and not cemented down; but the frames to be run with lead into the sink-stones.

Cart-stable. Form the lengthing of the cart-stable, and the several stables and sheds, with timber framing, re-using the old stuff as far as possible where it is sound, and providing sawn fir of the same scantlings where they may be required, if the old stuff does not yield a sufficient quantity; the quartering to be the same distance as before, and the whole securely traced and pressed together; and repair old framing in barn and cart-horse stable where necessary.

The old oak to be re-used for the roofs, as far as it will go, taking care that the scantlings are not less than those described in the sections, and any new supplied to be sawn fir of the same scantlings (finished) as those shown; plates to be in long lengths and

scarfed together at junctions, rafters to be in one length, and no joists or rafters to be more than 14 inches apart. Form loft over cart-horse stable, as shown, and floor with 1 inch boarding laid close, and lime for trap.

Boarding. The whole of the timber-framing to be re-boarded in the most workmanlike manner, with the best of the old boarding, nailed with proper lap; and any new required to be $\frac{5}{8}$ inch thick, or 6 boards out of a $2\frac{1}{2}$ inch batten, properly nailed and covered with two coats of boiling tar, laid so as to fill in all interstices, and remain perfectly weather-tight.

Form gutter between cart-horse stable and cart-shed, laid to a fall of $1\frac{1}{2}$ inch in 10 feet, 12 inches wide at the narrowest width; 1 inch gutter-boards and bearers, and 6lbs. lead turned up under tiles, 9 inches on each side.

Tiling. Cover the whole of the roofs with plain red roofing-tiles, of good and approved quality, hung with two oak pegs to double fir tiling-laths, nailed on the back of rafters.

Ridges. All ridges to have plain red ridge-roll, and hips with proper hip-hooks.

The whole of the tiles to be laid and set in mortar.

Eaves. Put to all eaves $4\frac{1}{2}$ inch half-round eave spouts, with all necessary stopped ends and junctions, set in red lead. Junctions with rain-water-pipes to be cast-iron, and to be let into 4 inch rain-water down-pipes; these pipes to have all necessary junctions, with drains and necessary bands and beads.

Provide all iron-work necessary for roofs and other timber-framing, and paint iron in oils before fixing.

Posts. The posts supporting the open sheds to be wrought of oak chamfered, tenoned into head-piece, and tenoned into stone bases with stub tenons 12 inches long.

Doors. The doors to cart-horse stables, cow-house, turnip-house, and calf-house and lofts, to be formed of 2 inch

framing, and filled in with 1 inch upright boarding, braced and ledged at back, and hung with 18 inch cross-garnet hinges, the space over the doors to be filled with one inch bars, set diagonally, 4 inches apart, to give light; also the windows at the end of cow-house. The doors in pig-styes to be similar, with weather capping, and hung to posts, 4 inches by 4 inches, rebated and wrought, tied into walls.

The barn-door opposite house to be repaired and made thoroughly good, and new barn-door on opposite side to be newly framed and re-hung. New breast-framing to be formed and placed, using up the present material as far as it will go.

Doors to poultry, tool-house, nag-stable, loose box, and other sheds, to be 1 inch upright boarding, nailed to 7 inches by $1\frac{1}{2}$ inch braces and ledges, and hung as before described.

Strong Norfolk thumb-latches to be supplied to all the above.

Stall divisions.

The stall divisions to have 4 inch by 4 inch posts, and 4 inch by 3 inch capping and rails, and filled in with $1\frac{1}{4}$ inch boarding.

The stall divisions in the nag-stable to be altered in position, as shown on plan; the present mangers being re-used; the new harness-room to be a lean-to against the present stable, 8 feet high to the plate, and lined with $\frac{3}{4}$ inch boarding up to 6 feet from the floor. A loft to be formed over the nag-stable, boarded with the present boarding, and trap 2 feet 6 inches square, formed for access.

Mangers.

The mangers throughout to be framed with 2 inch stuff, and lined with 1 inch boarding, as shown on sections, with proper bearers. The racks to have 2 inch top and bottom rails and sides, and $1\frac{1}{4}$ inch uprights, rounded 5 inches apart.

The cart-horse stables to be boarded up above the racks, as shown, and all to have proper bearers and brackets, and left complete.

Form in $1\frac{1}{4}$ inch stuff, in cart-horse stable, a chaff-shoot from bins above, and chaff-box below, as

shown, with cover ledged and hung with 12 inch cross-garnets.

The pig troughs to be of cast-iron, of approved pattern, and of the lengths shown.

Harness-pegs, &c., in present stables, to be preserved and retained; but the fixing, &c., not to be included in this contract. Glaze window in harness-room with second Newcastle glass in small panes.

Form two tiers of nests in turkey and poultry houses, of the sizes shown, the lowest nest 2 feet 6 inches from ground, and all on proper bearers; and all out of 1 inch stuff.

Provide for loose-box Cottam's improved angle-manger and water-trough, p. c. value £1 10*s*.

Provide, and hang on strong hook-and-eye strap-hinges, oak entrance gates to both entrances; the old posts to be re-used if sound, if not sound, posts of the same size to be provided, sunk in the ground, and rammed against; gates to be framed and braced with 3 inch by 2 inch oak, and covered with 1 inch oak boarding; strong wrought-iron latches to be provided to these gates.

Paint all outside wood of doors and window-frames 4 coats in oil, last coat to choice, and all iron-work 2 coats before, and 2 coats after fixing.

Provide and fix to manure tank a liquid manure pump, of galvanized wrought-iron, $4\frac{1}{2}$ inches diameter, with service from tank complete.

Provide house-pump, 3 inches diameter, fixed against trough, with 2 inch lead service from rain-water-tank complete.

Note.—It is to be distinctly understood that the whole of the old material that is possible, and will come into the terms of this specification, is to be re-used if sound, and the rest is to remain the property of the employer.

The digging to foundations and trenches, and other earth-work, cartage of materials, and pulling off

thatch, to be done by the tenant of the farm, and is not to be considered as forming part of this contract; also gravel and materials under cart-shed.

WORK REQUIRED TO BE DONE TO OLD COTTAGE ON THE FARM.

The whole of the brick-paving to be repaired and made good.

Put new sashes to windows on ground-floor, and insert opening-casements in each, with proper stay-bar and fastener; re-glaze windows, and also re-glaze where required in bed-rooms.

Sink earth round the walls to the level of the front paving, 2 feet away from walls, and pitch the surface with rubble paving.

Reparge flue, and narrow it at the base to prevent back-draught, and provide new chimney-pot.

Set new grate, p. c. 15*s*., and supply bricks for backing.

Point all walls outside.

Repair slating carefully with new slates where required.

Repair and make good all ceilings.

Whitewash all walls inside, and paint all iron and wood-work in 3 oils.

Repair stairs, and form cupboard under stairs with 3 feet 4 inch upright boarding, with door and cupboard-lock complete.

Whitewash privy, and repair paving and door.

Provide new oak posts, flap, and frame to well, similar to old.

The price for work to the above cottage to be sent in separately.

CHAPTER XXVII.

SPECIFICATION *of the work required to be done and materials supplied in erecting a new* WORKHOUSE *at for the Board of , to be in accordance with the plans and this Specification, and under the superintendence and to the entire satisfaction of the architect, Mr. of .*

GENERALLY.

Notices to public officers. (See p. 75).

Clear site. To clear the site of all rubbish, and cart away from the site of the buildings and yards all vegetable soil.

Old drains. Take up all old disused drains and fill in and ram.

Water. Provide all water for the use of the works.

Clerk of the works office. (See p. 267).

Hoarding. To erect and provide all necessary hoarding and protection to the works during their progress next the roadway.

EXCAVATOR.

Ground work, (See pp. 75, 76).

Concrete (lime). (See pp. 75, 76).

Cement concrete. The "cement" concrete to be composed of one part Portland cement and six parts clean washed ballast and one of sharp sand.

BRICKLAYER.

Samples. (See p. 79).

Bricks. (See p. 79).

General brickwork. (See p. 76).

Gauged arches. (See p. 76).

Other arches. (See p. 76).

Facings. (See p. 76).

Chimneys. (See p. 76).

Set stoves and ranges. Set stoves, with all necessary fire-brick material; the Galton stoves used in the dormitories, day rooms, and wards to have 3 inch sawn York lintels, 18 inches deep, built in the brickwork, with holes cut in same for smoke, flue, and two air ditto. Provide to the openings of the other stoves a 2 inch by $\frac{3}{8}$ inch iron chimney bar, 18 inches longer than the opening, and caulked ends.

Trimmer arches and fenders. (See p. 77), and build 9 inch fender walls for ground-floor fireplaces.

Tile crestings. (See p. 77).

Damp course. (See p. 240).

Bedding. (See p. 77).

Pointing. (See p. 150).

Drainage. (See pp. 77, 78).

No rain-water pipes or waste to be connected direct with the drains, except ventilator and soil pipes, but to empty over "Doulton's" gullies fitted with iron gratings.

Rain-water cistern. (See p. 78).

2 rods extra brickwork. (See p. 78).

Mortar. (See p. 79).

Cement. The cement to be the best Portland mixed with three parts sharp washed sand.

Mode of doing the work. (See p. 79).

Jobbing work. (See p. 79)

Man holes. Build man-holes and flushing tanks in 9 inch

second gault bricks in cement, as per detail drawings, the latter to be rendered inside with 1 inch of Portland cement, and connected with drains.

Ventilating drains.

Provide 6 inch ventilating drains, as shown, continued above ground, with 6 inch cast-iron pipe taken above roofs, and provide same with strong zinc cap and all necessary iron bends. The joints in these pipes to be made in red lead.

Latrine walls.

The latrine walls to be faced both sides with the best white glazed bricks, and the yard round the same to a height of 8 feet, and rounded to all angles and sills.

Ventilation.

Build in the upper and lower parts of the external walls of all the wards, day rooms, dormitories, and other apartments at distances of 8 feet apart, air bricks 9 inches by 6 inches, covered on the inside with perforated zinc holes $\frac{1}{20}$th of an inch in diameter, carry 6 inch drain-pipes, with joints in cement, under ground-floor, connected with 6 inch circular galvanized iron gratings on outside, and opening in hearths to admit fresh air for stoves, and 4 inch cast-iron similar air tube, and 6 inch by 6 inch galvanized iron air grating, as above, to stoves in wards and other apartments above the ground-floor.

Areas.

Build areas, as shown, in 9 inch brickwork, the open areas coped with brick on edge in cement. The dry area arched over at top, and 9 inch by 6 inch galvanized iron gratings, 6 feet apart, for ventilation, let into the crown.

Paving in cement.

Pave the heating chamber and other underground apartments and areas with 4 inch bed of cement concrete, trowelled on face in 1 inch of Portland cement. Lay in the areas a half round 9 inch stoneware pipe, jointed in cement, and connect with the 9 inch gullies before described to carry off rain-water.

Paving in asphalte.

Lay 4 inch bed of cement concrete in laundries, latrines, and the yards (coloured blue on the plan), with face of asphalte $\frac{3}{4}$ inch thick, either Limmer or other approved (with fall to gullies). To be laid by the manufacturers.

MASON.

Generally. To execute the whole of the dressed stone masonry, shown on the elevations with a yellow tint in the best stone, perfectly sound, free from sand-holes, cracks, vents, or other bad qualities, and no stone but what is unexceptionable to be brought upon the premises on any pretence whatever.

Bedding. All stone to be set on its natural or quarry bed.

Setting and hoisting. All stone to be hoisted and set in a most careful manner, such stones as are of magnitude requiring it to be hoisted and set with proper tackle, and provide all tackle, gear, ropes, cranes, rollers, and tools of every kind, to securely fix the work.

Sills. To put to all the window sills of stone, 4 inches in height and 12 inches in bed, weathered at top, and throated under the projection.

Copings. To finish all the parapets and gables, and the dwarf-walls of the arcade, with stone coping 13 inches average width, throated and chamfered next the front, and plugged with lead at all the joints therein; the raking parts of the coping are to be cramped with strong copper cramps to pieces of bond-stone carried up in the brick-work behind the same.

Stone under dormer-windows. To put under each of the six eastern and western attic dormer-windows a piece of 3 inch stone, 5 feet long and 2 feet wide, under which the brick-work is to be corbeled out to support the brick jambs of the dormer-windows.

Door-steps. To be 3 inch tooled York, to project 2 inches.

Hearths. Provide and set 2 inch rubbed York hearths and slabs to project 2 feet 6 inches where the stoves will be used, and cut 4 inch holes in the same for air pipes, to supply fresh air to the stoves.

Mantels. Provide, as shown on the drawings, solid moulded Portland stone mantels to day rooms, wards, and dormitories. Also provide rubbed box York mantels to the living and bedrooms of the master, the mistress, and

the other officers, to be average 3 feet opening, and 10 inch jambs, head, and shelf.

Corbels. Provide and build in under the principals of the roof and under the ends of all beams and bressummers Yorkstone corbels 12 inches by 14 inches and 6 inches thick.

Pier caps. Provide and set to all gate piers Portland stone caps 2 feet by 2 feet by 9 inches weathered and throated all round.

Cut all holes and do all jobbing. Cut all holes for iron railings and otherwise as directed. Do all jobbing and attendance on other trades.

SLATER.

Cover the roofs with the best red Bangor countess slating, each slate securely fixed with two galvanized iron rails, and with full 3 inch lap on 1 inch close sawn boarding.

Hips. Cover the hips with strong slate roll and sawn flaps bedded in red lead and screwed down.

Ridges. Cover the ridges with plain tile ridge set in hair mortar.

Cement fillets to lean-to roof and lead flashings where directed.

CARPENTER AND JOINER.

New materials. (See p. 82).

Timber and deals. (See p. 83).

Sundries. (See p. 83).

Shoring. (See p. 83).

Wood bricks. (See p. 83).

Lintels. (See p. 83).

(See p. 97).

Joists. Upper floor joists and all other joisting to boarded floors to be 11 inches by 2 inches, plates 4 inches by 3 inches, trimmers 11 inches by 3 inches, and two tiers of herring-bone strutting.

Roofs. Roofs to be framed according to the drawing, with rafters $4\frac{1}{2}$ inches and $2\frac{1}{2}$ inches, plates 4 inches by 4 inches, and 6 inches by 4 inches, purlins 6 inches by 4 inches, struts 5 inches by 4 inches, ceiling joists and collars 4 inches by 2 inches.

Chapel ditto. The roof of the chapel to have the scantlings as marked on the drawings, and to be wrought where exposed to view, and moulded and stopped where shown.

Pitch pine. All timbers of roofs and floors where exposed to view to be of pitch pine.

Schoolroom roof. The schoolroom roof to have 1 inch wrought-iron tie and king rods, cast-iron shoes and heads, and wrought T iron struts $\frac{3}{8}$ inch metal, the whole bolted together, as shown on detail drawing.

Dog irons. Dog irons 2 feet long $\frac{3}{4}$ inch metal to strap together the principal rafters and collars with iron wedges and pins.

Slate boarding. The whole of the roofs to be covered with 1 inch rough close boarding except the latrines, which are to be covered with $\frac{3}{4}$ inch wrought match boarding in 4 inch widths and 2 inches by $\frac{3}{4}$ inch slate battens.

Roof ventilation. Put down the centre of the ceilings of the dormitories, day rooms, and wards perforated zinc 18 inches wide fixed with a 3 by 2 chamfered fillet on each side.

Laundry, latrine, and urinal roofs. These roofs to be all wrought and covered in as above described, rafters and collars $4\frac{1}{2}$ inches by 2 inches, plates 4 inches by 3 inches, ridge 9 inches by 2 inches, valleys 9 inches by 2 inches. Form a lantern light with 4 inches by 3 inches framing, sill to be weathered with 5lbs. lead apron piece nailed to the back of sill. The sides and ends of the lantern filled with No. 16 gauge zinc louvres, and framing rebated to receive them.

Laundry, &c., roofs (*continued*).

Form a light over with 5 inch by 2 inch rebated ridge piece and end pieces, and $2\frac{1}{2}$ inch by $1\frac{1}{2}$ inch moulded sash bars glazed with Hartley's $\frac{3}{16}$ inch rolled plate glass.

Fill in the openings between the piers with 4 inch by 4 inch square framing, and fix up on same 5 inch by $1\frac{1}{4}$ inch luffer boards fixed on centres and furnished with a $\frac{3}{4}$ inch wrought-iron bar to open and close the luffers when required, the bar being fitted with hooks and eyes, staple and padlock, in order to secure them.

Bearers.

Bearers to carry the roof of urinals 9 inches by 4 inches wrought and chamfered, also 6 inches by 4 inches ditto to carry the flushing tanks. Bearers of the other cisterns 10 inches by $2\frac{1}{2}$ inches, and the cisterns blocked off them with 4 inches by 4 inches pieces.

Latrine seats.

Fit up the latrines with $1\frac{1}{4}$ inch deal seats each in two pieces, hinged, and 1 inch riser fixed to 3 inch by 2 inch framing, and fix to each seat a strong galvanized iron staple and padlock.

Wood floors.

The whole of the upper floors and ground floors over the cellars to have $1\frac{1}{4}$ inch iron tongued yellow deal flooring, laid after the plastering is done, 3 inch by $1\frac{1}{4}$ inch mitred borders to all hearths, and when no skirting is provided fix $1\frac{1}{2}$ inch angle fillet to cover the joint between the wall and the floor.

Lay 1 inch rough floor to cistern rooms.

Skirtings.

Put 9 inch by 1 inch torus skirting to the master's, mistress's, and other officials and private rooms.

Wood block flooring.

Lay the whole of the ground floors except where they come over the cellars with wood block flooring formed of cubes of pitch pine 9 inches by 3 inches by 2 inches thick formed with a dovetail groove on the under side, and upon a thickness of 4 inches of cement concrete and 1 inch cement rendering. The blocks to be laid jointed and grouted in cement. The chapel floor to be similar, and to have the place by the altar laid herring-bone with oak borders.

Sashes.

Fit up the whole of the windows of the wards, corridors, dormitories, and day rooms with $2\frac{1}{2}$ inch ovolo sashes, and the other windows except the chapel with 2 inch ovolo sashes, all double hung in deal cased frames, oak sunk and weathered sills, axle pulleys, patent lines, iron weights, and wrought-iron sash lifts. The lower sashes to be blocked.

Scotia moulding.

Fit up a $1\frac{1}{2}$ inch scotia moulding round sashes scribed to plaster and brickwork to cover the joints.

Chapel seats.

Provide the chapel sittings, as shown in the drawings, of pitch pine, $1\frac{1}{2}$ inch seats, $1\frac{1}{2}$ inch open framed backs, $1\frac{1}{4}$ inch brackets, $2\frac{1}{4}$ inch skeleton framed ends, and 1 inch bookboards.

W.C.'s.

Fit up the upper and private W.C.'s with $1\frac{1}{4}$ inch clamped flap, hole cut flap, and seat hinged to open up, 3 inches by $\frac{1}{2}$ inch skirting round top, 1 inch risers to slide in grooves, and the seat secured to the riser by one screw, 3 inch by 2 inch bearers.

Earth closets.

(If earth closets are used then describe as follows :—)

Provide and fit up the closets with Moule's apparatus No. 4 "pull up" with brass handle, and the closets in the yards with ditto No. 2 "pull up" galvanized iron pails to hold 12 charges to each closet. All the closets to have 1 inch framed seat and riser, $\frac{3}{4}$ inch match boarded back, and 1 inch fixed and rounded back to enclose the earth reservoir. Fix the whole on 3 inch by $1\frac{1}{2}$ inch sawn bearers and uprights. The earth reservoirs to be filled from the outside, 3 inch by $2\frac{1}{2}$ inch wrought, solid, and rebated side frames morticed into step and window sill above, and 1 inch ledged door hung with 1 foot 6 inch strong strap hinges and furnished with iron button.

Enclosure for nurses in dormitories.

The enclosures for nurses to be 2 inch square framed partition 8 feet high, with door in each complete, with night latch, and hung with $3\frac{1}{2}$ inch wrought-iron butts.

Cupboards.

Fit up cupboards, one in each nurse's room, one in each dormitory, and where shown in wards, day

rooms, class rooms and school rooms, and private rooms with $1\frac{3}{4}$ inch square framed fronts and ends, 6 foot 6 inches high, 1 inch wrought and rounded top, doors hung with 3 inch bulls and fastened with good dead locks, and either rails and pegs or shelves inside as directed.

Store closets. Fit up the store closets and larders with three tiers of $1\frac{1}{4}$ inch deal shelving as shown in the plans, upon proper bearers.

Bath tops. Bath tops to be $1\frac{1}{2}$ inch deal shaped and rounded on angles, and supported on open 3 inch by $1\frac{1}{2}$ inch framing.

Provision of shelving. Provide in the sculleries and pantries for feet super of $1\frac{1}{4}$ inch shelving fixed with proper bearers and cast-iron brackets.

Sinks. Provide the sinks shown of the sizes marked, to be Doulting's vitrified stone ware and fitted with bell grating and $2\frac{1}{2}$ inch lead waste pipe connecting it with the outside soil pipe.

Provision for laundry. Provide feet cube framed fir wrought to be used in framing in laundry and drying room.

Traps to cisterns. Turn ceiling joists and rafters and provide traps to roofs by cisterns 2 feet 6 inches by 2 feet 6 inches with $\frac{3}{4}$ inch linings and 1 inch ledged top.

Doors. The external doors to have $4\frac{1}{2}$ inch by 4 inch rebated and beaded frames, and doors to have 2 inch rebated top and side rails filled in with $\frac{3}{4}$ inch by 4 inch ploughed, tongued, and beaded boarding, $1\frac{1}{4}$ inch rails and braces at the back hung with 4 inch wrought-iron butts and fastened with 7 inch rim locks.

Internal doors. Internal doors to be 2 inch 4 panel square doors hung with $3\frac{1}{2}$ inch wrought-iron butts in $1\frac{1}{2}$ inch rebated jamb linings and fastened with 6 inch mortice locks. The architraves to be 3 inch, bold moulded. All locks to be Hobbs's, and those to the external doors to be such that they can be opened by a master key.

Galleries. Construct in the class rooms galleries where shown

with 7 inch by 3 inch bearers, and 4 inch by 3 inch plates, 2 inch blocking pieces to spandrels, 1 inch risers and $1\frac{1}{4}$ inch floor, risers 7 inches high, step 18 inches wide.

Chapel fittings. Provide the sum of £ for chapel fittings extra to the sittings.

PLASTERER.

Lime, cement, hair, sand, and laths to be of the best description. In the lath work the heading joints to be broken every 3 feet. Cut out any blisters that may occur and make good the same.

Ceilings. Lath, render, flote and set all ceilings, and whiten same.

Walls (finished in selenetic). Render, flote, and set and finish in selenetic to a trowelled face all internal walls, in five parts clean sharp sand and one part approved selenetic cement, and run round the walls a sunk bead to form dado. All projecting angles to be rounded, including those to window and door openings.

SMITH, FOUNDER, AND PLUMBER.

Iron gutters. Provide $5\frac{1}{2}$ O. G. cast-iron gutters to main roofs and $4\frac{1}{2}$ inch ditto to the others, with proper outlets and stopped ends, and $3\frac{1}{2}$ inch cast-iron down pipes as shown on plans, with all necessary heads, swan necks, bends, shoes, &c. No rain water pipes to be connected direct with drains but to empty iron gulley traps or as shown in plan.

Lead gutters and flashings. Lay vallies and chimneys and other gutters with 6lb. milled lead turned up 9 inches under slates and 5 inches against brickwork, 4lb. lead flashings and step flashings where roofs finish or rake against walls or chimneys.

Cisterns and tank. Provide and set in the water tower a cistern to hold gallons, to be formed of stout boiler iron bolted and rivetted together with red lead and iron cement in the joints, and two tie rods of $1\frac{1}{4}$ inch diameter in the centre of the tank. The tank to have

a central compartment connecting with each other by two 3 inch openings so that one compartment can be emptied and cleansed, leaving the other compartment for the time being to carry on the work. The tank to be placed upon the rolled iron joists shown in the drawings, which are to be Macfarlane's double T flanged, 9 inches in height and 5 inches in the flange out of $1\frac{1}{4}$ inch iron. The cisterns for the laundry, the kitchens, and scullery, latrines and water-closets to be placed each in the most convenient position that can be provided for them, and to be galvanized iron of gallons each. Each tank and cistern to be fitted with a ball cock and short lead warning pipe.

Water supply.

The water supply to the water tank to be by strong $2\frac{1}{2}$ inch pipes well and securely jointed, and with an approved ball cock and stop cock at junction with main. The service from the tank to the several cisterns to be $1\frac{1}{2}$ inch strong lead pipe, and 1 inch strong lead service from the cistern to the several points requiring it.

Hot water.

Provide an approved boiler and furnace in the heating vault, and supply return and flow $1\frac{1}{2}$ inch strong steam pipes to the hot water cistern above the bath rooms, which is to be of galvanized iron and to hold gallons. Supply with 1 inch piping the lavatories and baths and sinks.

Rain water.

Provide and fix a lift pump complete with fly wheel and $1\frac{1}{2}$ inch suction pipe, to lift water from the rain-water tank 15 feet high into a galvanized iron cistern of gallons in the laundry, with warning pipe complete, and 1 inch iron service and bib taps for filling the wash tubs. Lay on also to this cistern the water from the upper water tank in case of scarcity of rain water with stop and ball cock.

Laundry fittings.

Provide £ for furnace boiler and hot water supply to laundry and drying closet.

Latrines.

Fit up the latrines (each length feet) with Bowes, Scott, and Read's patent cast-iron enamelled latrine troughs complete with inlet and outlet, and No. of the same firm's 100 gallon galvanized iron flushing tanks and connect tanks and troughs with 5 inch cast-iron pipes. Troughs to be bolted together

and all joints to them and connecting pipes made in red lead.

Patent syphons

Provide No. , Bowes, Scott, & Read's patent self-acting annular syphons in iron, size A in their list, and fix up the same in the brick-built flushing chambers where shown in the plan, syphons to be fixed in 3 inch York stone 2 feet 6 inches by 2 feet 6 inches, and bolted down with small bolts leaded down into the stone.

Pipes and taps.

All cocks and taps to be of the best screw down valve kind as approved under the Water Act Regulations, to be of the sizes specified for the supplies. Lead pipes to be of the following weights:—

$\frac{3}{4}$	inch	9lbs.	per	yard.
1	„	12 „	„	„
$1\frac{1}{4}$	„	16 „	„	„
and larger pro rata.				

The best iron steam pipes to be used for the hot water work.

All necessary unions, connections, &c., to be provided.

Lavatories.

Fit up the lavatories with No. basins of Jennings's "tip up" made of strong vitrified stoneware and hot and cold water laid on to them as before described, the filling for each group of basins being by means of one stop cock to hot and one to cold water, with short pipes to each basin from the supply pipe, 2 inch lead waste from these basins to the outside soil pipe.

Baths.

Fit up the bath rooms with Macfarlane's 5 feet 6 inch cast-iron baths with waste and overflow in one, painted in sharp colours. The waste to be carried to outside the walls and to empty upon a plain head connected with a 3 inch cast-iron pipe which is to be connected with the drains. The wastes from the lavatories to be connected with this pipe head.

Water-closets.

The water-closets to be fitted with Jennings's white valve closet and trap in one piece, 4 inch 7lbs. lead soil pipe, and continue same with 4 inch cast-iron pipes taken above the roof three feet and furnished with a strong zinc cap.

Urinals. Fit up with glass screen at ends formed of two pieces of $\frac{3}{8}$ inch rough plate glass and $\frac{1}{4}$ inch wrought-iron rim and filled in between with Portland cement, and line the backs and sides up to the height of screens, also the bottoms and sides of troughs and 12 inch paving piece on front with similar glass bedded in cement. The splash piece in front of troughs to be in 1 inch rough plate with ground and rounded top edge and carried by two strong wrought-iron stays fixed below the paving. Fit up $\frac{3}{4}$ inch pierced copper flushing pipe along the whole length with $\frac{3}{4}$ inch supply and regulating tap, and 4 inch brass grating cover to outlet of drain.

Iron railing. Provide complete wrought-iron railing to enclose the steps to the heating chamber.

Stoves. Provide and set in the wards, day rooms, dormitories, and chapels 42 inch by 42 inch Galton stoves as supplied by Messrs. Yates & Haywood, 95, Upper Thames Street, and in their list size No. 1, No. 1372, ground and japanned face complete, 12 inch by 9 inch cast-iron air grating, and No. 2 hit and miss gratings to each stove fixed as directed. Provide and fix 36 inch register stoves, value 6d. per inch in the master's, mistress's, and all other private and official apartments. The board room to have a register stove of 42 inches.

Zinc ventilators. Provide and fix in main roof, No. — small gablet ventilators constructed in strong zinc and covered on face with perforated zinc to exclude birds.

Iron grating. Put to the small window area by the heating chamber a wrought-iron grating $1\frac{1}{4}$ inch by $1\frac{1}{4}$ inch frame and 1 inch by $1\frac{1}{4}$ inch bars 2 inches apart.

Coal plate. Provide strong 18 inch diameter iron coal plate and chain and staple complete to coal shoot.

Boyle's ventilators. Provide and fix in school room and chapel roofs No. — Boyles' patent air pump ventilators, 18 inch diameter galvanized iron plain ventilator, value £4 10s. each.

Man-hole covers. Provide and fix No. 4 strong iron man-hole frames with hinged covers and ventilating gratings 2 feet 6 inches by 2 feet 3 inches.

Chapel casements. (See p. 381).

Provide bolts, &c. Provide all bolts, plates, ties, iron corbels, cast caps for principals, &c,, &c., as described for the other trades.

Jobbing work. Cut and drill all holes and do all jobbing required.

PAINTER AND GLAZIER.

Glazier. Knot, stop, prime, and paint the whole of the internal and external woodwork except the pitch pine four coats in oil. Paint all ironwork twice before and twice after fixing. Paint the dado five feet high all round the walls inside the buildings except the master's, mistress's, and other private apartments four coats of good oils, and twice colour the upper portions of approved tints. Colour twice of approved tints the walls of the private rooms except the master's and mistress's rooms. Size and twice varnish all pitch pine work. Clerecole and whiten all ceilings.

Twice limewhite basements and under the galleries.

Glazier. Glaze all the windows, except chapel, with 21oz. sheet glass.

Chapel windows. (See p. 344).

Gas fitting. Gas fitting not to be included in this contract.

PAPER HANGER.

Prepare and hang walls of master's and mistress's sitting rooms with paper value 2s. 6d. per piece.

CONCRETE BUILDINGS.

Regulations of the Metropolitan Board of Works.

Whereas, by the Metropolitan Building Act, 1855, it is provided that buildings to which the Rules enacted in the Schedules in that Act relative to the construction and materials of walls are inapplicable, require the special sanction of the Metropolitan Board of Works.

And whereas it has been shown to the satisfaction of the said Board that buildings of certain moderate dimensions may be advantageously constructed of Portland cement concrete, compounded with proper attention to the quality of the cement and in the proportion thereof to the concrete materials and to the due application of a mould or machine for giving cohesion to the work during its progress.

Now, therefore, the Metropolitan Board of Works do hereby approve of and licence the use of Portland cement concrete in the construction of the buildings aforesaid, subject to the conditions following, viz. :—

1. The concrete to be used to be composed of Portland cement and of clean Thames ballast, or gravel, or crushed smith's clinkers, or brick burrs, or small broken stones, or any hard and durable substance, and each to be passed through a screen having a mesh not exceeding two inches in diameter. Sand to be in or added to such materials in the proportions of one to two. All such materials to be perfectly clean and free from all greasy, loamy, or clayey matter.

2. These materials and cement to be mixed in the proportion of not more than eight parts of material as aforesaid by measure to one part by measure of the best Portland cement.

3. In making the concrete a box, two feet by four feet by two feet, or other like proportions, is to be used for the materials other than the cement, and another box, capable of holding one sack or half or each containing two bushels, is to be used for the cement. The cement and the materials are to be turned over at least three times and thoroughly mixed together with water.

4. The walls of buildings to be carried up all round in regular layers with concrete thus composed, and grouted with cement in the proportion of one of cement to two of clean sharp sand after each layer, until the walls are completed in height. The grout to be made as mortar first and then thinned with water to the necessary consistence.

5. The concrete to be well and thoroughly bound together so as to secure the complete cohesion of the materials and work during its progress.

6. The thicknesses of walls to be equal at the least to the thickness for brickwork described in the Building Act.

7. Suitable cores to be used for flues and also for recesses. Flues to be formed with stoneware or fire-clay pipes not less than half an inch in thickness unless properly pargetted.

8. Door and window frames to be built into the walls.

9. The portions of the party-walls and chimney-stacks above the roofs of buildings to be rendered externally with Portland cement.

10. The Rules of the Metropolitan Building Act, 1855, as to the use of timber in walls, and the other Rules of that Act so far as they may be applicable to concrete buildings, are to be observed.

11. There shall be paid to the District Surveyor in respect of his supervision of every concrete building a fee one-half more in amount than the fee to which he would be entitled under the Building Act for new buildings or additions. No additional fee is, however, to be charged in respect of any alteration to a concrete building.

BUILDING CONTRACTS.

General Headings as settled between the Royal Institute of British Architects and the London Builders' Society.

1. Contractor to provide everything necessary for works as per drawings and specification, or to the true intent and meaning thereof; and if drawings and specification differ, the architect to decide which to be followed.

2. Contractor to conform to general acts, regulations, and bye-laws relating to buildings, to give notices thereby required to local authorities, and pay fees payable thereunder.

3. Contractor to set out works, to rectify errors, provide appliances, and to produce vouchers proving materials to be as described and genuine when required. The contractor to provide plant, labour, materials, &c., required. All materials to be the best of their several kinds. To leave all perfect and clean.

4. Contractor to keep on ground a competent foreman and to be supplied with a complete copy of drawings and specification by the architect or measuring surveyor. Not to sublet without consent.

5. Architect to have at all times access to the works, which are to be entirely under his control. He may require contractor to dismiss any workman incompetent or misconducting himself, and thereupon the contractor is to do so.

6. Contractor not to deviate from drawings and specification or execute extra works, unless required to comply with the aforesaid acts and regulations or bye-laws, or unless upon the authority of architect to be shown by written order, or by plan and drawing expressly given and signed, or initialed as extra or variation, or by subsequent written approval signed or initialed. Vouchers for all such extras to be delivered to the architect or clerk of works weekly in case of day work. No day work to be admissible unless so ordered, or for work impossible to be measured.

7. Alterations in or additions to works not to vitiate contract, and if no price be agreed, the value thereof to be added to or deducted from contract, according to schedule of prices or for measure and value.

8. Work and materials brought on ground to be considered property of employer when included in any paid certificate, and not to be removed without architect's consent; but employer not to be liable for loss or damage thereto.

9. Architect may require such materials to be removed as in his opinion are not according to specification, and others to be

substituted, and in case of delay the employer may remove same and substitute others at contractor's cost.

10. Architect may require work in his opinion executed of improper materials or defective workmanship to be re-executed; and in case of delay may cause same to be done at contractor's cost.

11. Faults arising from improper or defective workmanship or material within months after completion to be made good by contractor, and in case of default employer may recover costs thereof from contractor.

12. Contractor to insure in office to be approved in joint names in half amount of contract until work is covered in, and thenceforth in three-fourths until completion, and to produce policies and receipts for premium. Moneys received to be applied in rebuilding or reparation; in case of neglect employer may insure at contractor's cost.

13. Building to be under contractor's sole charge, who is to make good damage by fire or from causes under his own control, and to hold employer harmless as to injuries to persons and structural damage to property.

14. Employer to have access to building, and may execute other works, for which contractor is to give reasonable facilities so that his work may not be impeded. Contractor not to be responsible for damages to or occasioned by such other works.

15. Works (except painting and papering) to be completed in months after commencement, unless in case of inclement weather, causes not under the control of contractor, combination of workmen, strike, or lock-out affecting any building trade, in which case architect to extend time, and contractor to complete within such time as the architect shall consider reasonable and in writing appoint. In case of delay employer to be entitled to pounds per week as damages, if architect shall in writing certify that works could have been reasonably completed in the time appointed.

16. If contractor become bankrupt, compound with or make assignment for benefit of creditors, or suspend or delay the works except on account of causes mentioned in Clause 15 or on account of proceedings by parties interested in adjoining properties or for want of proper instructions duly applied for, employer may require works to be proceeded with, and if requisition be not complied with for days may enter and complete works. The cost incurred to be repaid by contractor.

17. Contractor to be paid, on certificate of architect and at architect's discretion during the progress of the works, as previously agreed, 80 per cent. of value of works executed until balance of percentage equal 10 per cent. in contract sum, and thenceforth to be paid full value. When works completed or possession given up, contractor to be paid moiety of balance of

moneys payable to him, except £ for papering and painting, and the remainder months from the completion of works or giving up possession. Provided always that no final or other certificate shall cover or relieve the contractor from liability as defined in Clause 11, whether the same be noted at the time or subsequently to giving such certificate or order.

18. Certificate of architect or award of referee showing amount payable to contractor to be evidence of completion without prejudice to liability of contractor to make good defects as aforesaid. The sum reserved for papering and painting to be paid to contractor on completion thereof.

19. If employer make default for days in payment of any moneys due to contractor, or if works be delayed for months by proceedings of adjoining owners, contractor to be at liberty to suspend works and require payment for works executed, materials wrought up, and loss on goods or materials purchased for the works, and not to be bound to complete contract.

20. *Arbitration Clause.*—With regard to quantity or value of extras, and omissions or variations in the contract, and questions of delay or the withholding of certificates, or the true intent and meaning of the drawings and specification as to cost, the arbitrator being an architect and a Fellow of the Royal Institute of British Architects, agreed to by the parties or appointed by the President (for the time being) of the Royal Institute of British Architects. The arbitrator to award costs between employer and contractor.

Memorandum. In cases where the quantities are provided it is recommended that, unless a surveyor be mutually agreed upon by the architect and builder, two surveyors be employed to take off the quantities, one appointed by the architect and the other by the builder at a meeting convened for the purpose.

INDEX.

ABUTMENTS, 49.
Accumulation of water, &c., 337.
Additional ties, 354.
Adjoining gutters, 188.
Air-bricks, 281.
,, flues, 390.
,, gratings, 249, 272, 281.
Altar rails, 361.
Alteration of levels, 230.
Alterations, &c., to the present building, 239.
Alterations to chimney, 178.
Angle staves, 86, 158, 214, 311, 369.
Arches, 204, 211, 275, 365, 376.
,, arrises, &c., 228.
,, gauged, 76, 109.
,, not gauged, 76, 109.
Architects not scientific, 72.
Architectural drawing, 66.
Architraves, 272, 314, 329.
Area copings, 285.
,, gratings, 103, 125, 316, 331.
,, steps, 284.
Areas, 185, 281, 391.
,, in cement, 392.
Arrises, 372.
Ashlaring, 264.
Asphalte floor, 383, 391.
,, against basement walls, 262, 281.
Attic floor, 156.

BACK fronts, 192.
,, staircase (wood), 273, 329.
Bad building, 5.
Balconet, 123.
Balconies, 104.
Balusters, 301, 302.
,, (wrought iron), 275.
Bands and strings, 211.
Basement doors, 291.
,, flooring, 247.
,, paving, 284, 321.
,, staircase, 314.
,, stairs, 96.
,, window fittings, 289.
Basement windows (glazier), 299.
Bases (stones, for posts), 219.
Basins, 297.
Baths, 106, 265.
,, stone, 376.
,, top, 273.
Battening, 97, 269.
Beads, quirks, &c., 127.
Beams, architraves, &c., 257.
Bearers, 395.
Bedding, 77, 93, 129, 150, 179, 192, 233, 234, 241, 282, 306, 345, 358, 366.
Bell (church), 343, 353.
,, floor (church), 353, 361.
,, pulls, 303.
Bells, 104, 302, 319.
Bell turret, 369, 377.
Best room doors, 291.
,, stairs, 285.
Binders (cast-iron), 400.
Blocks for carver, 264.
Boarding, 385.
Boarding and felt, 347.
Bolts, 103.
Bolts to trimmers, &c., 103.
Bond (bricklayer), 338.
,, (slater), 82.
,, timber, 288.
Boxed shutters, 271.
Boyle's ventilators, 401.
Bracket (plasterer), 294.
Breastsummers, 60, 116, 135, 198.
Brick bands, 338.
,, coring, 283.
,, cornice, 110.
,, nogging, 111, 129.
,, on edge cresting, 231.
,, paving, 111, 242, 263, 305, 306, 366.
,, vaulting, 281.
Bricks, 79, 94, 130, 151, 179, 194, 205, 211, 218, 233, 306, 321, 358.
Brickwork, 224, 231, 320, 357.
,, to additional story, 179.
Build up window, 357.
Building contracts, 405.
Bulkhead, 255.

Butler's pantry fittings, 330.
,, sink, 259, 293.
Buttresses and piers, 231.

CANVAS plaster, 295.
Capping of piers, 233.
Cartage of rubbish, &c., 76, 166.
Cart shed, 384.
,, stable, 384.
Carving, 267.
Casements, 228, 312, 372, 381.
Casing cisterns, 292, 369.
,, to stone work, 268, 324, 341, 396.
Cast-iron columns, 103.
Ceilings, &c., 89, 162, 175, 295, 331.
Cellar doorways, 265, 291.
,, entrance, 168.
,, stairs, 306, 322.
Cement, 93, 110, 390.
,, courses, 375.
,, skirtings, 228, 229, 294.
,, to walls, 294.
Centering, 97, 133, 155, 182, 220, 268, 309, 324, 341, 354, 360, 368, 378, 396.
Cesspool, 78, 211, 218, 305, 364, 374, 383.
Chaces, 283.
Chamber flooring, 310.
Chancel steps, 359.
Chapel fittings, 398.
,, casements, 381.
Chimney-bars, 103, 138, 200, 224, 274, 281, 316, 331.
Chimney-pieces, 81, 95, 96, 113, 132, 152, 169, 181, 194, 212, 219, 225, 244, 266, 323, 367, 376.
Chimney-pots, 203.
Chimneys, 76, 93, 110, 129, 149, 191, 203, 210, 217, 224, 241, 282, 305, 320, 365, 390.
Cistern, 102, 106, 125, 259, 296, 315, 317, 333, 379, 398.
Cleaning, &c., (glass), 278, 318, 334, 373.
Cleaning off work, 81, 286, 340.
Clerk's office, 267.
Closet backs, 294.
,, doors, 100, 272, 313.
,, shelves, 137, 214, 255.
Closets, 87, 123, 160, 172, 221, 227, 255, 314, 329, 371.
Coal plate, 104, 401.
Coal plate stone, 96.
Cold bath, 277.
Colouring, 89, 138, 202, 205, 207, 215, 276, 316, 332.
Colours, 165, 176.
Columns, 103, 116, 138, 286, 301.
Combustible materials, 24.
Constructive principles, 36.
Contracting, 5.
Copies of drawings, 4.
Coping, 94, 95, 113, 180, 205, 225, 235, 284, 346, 357, 375.
Concrete (lime), 75, 304, 374, 384, 389.
,, (cement), 389.
,, filling in, 109.
,, buildings, 403.
,, floor, 279.
Contracts, building, 405.
Copper nails, 277.
,, set, 95, 110, 149, 284, 381.
Corbel cornice, 351.
Corbels, 95, 194, 393.
Cornice, 76, 93, 104, 127, 152, 228, 257, 296, 316, 332, 346.
Countess slating, 82, 245, 308, 323, 353, 367.
Covering to dry area, 243.
Cradling, 120, 251, 311.
Cramps, 80, 346.
,, and plugs, 14.
Cross-walls, 110, 150, 242.
Cube fir extra, 89.
Cupboards, 294, .
Curb flashings, 200.
,, (stone), 235.
Cutting, &c., 95, 96, 111, 211.

DAIRY, 244, 265.
Damp course, 224, 240, 320.
Deal-framed partitions, 86.
,, sashes, 270.
Decoration, 295.
Defects, 11.
Depression of architecture, 10.
Digging, 92, 108, 128, 147, 190, 210, 217, 227, 230, 238, 304, 320, 336, 356, 363.
Discouraging public works, 9.
Disputes, 2.
Distemper, 278.
District surveyor, 166.
Dogirons, 394.
Door cases, 87, 272, 314, 329, 370.

Door linings, 100, 122, 137, 159, 214, 221, 251, 272, 314, 328.
Doors, 121, 159, 186, 199, 213, 221, 251, 271, 312, 313, 354, 370, 377, 378, 385, 397.
Dormer, 90, 119, 163, 207, 208, 269, 372.
Double ceiling, 289.
,, walling, 239, 280.
Dowells, 263.
Drainage, 77, 94, 111, 279, 282, 305, 337, 364, 375, 383.
Dressed-stone work, 219, 224, 284, 359.
Dresser, 88, 102, 119, 126, 161, 173, 200, 214, 221, 227, 273, 293, 315, 330, 378, 400.
Dry areas, 262.
Dust bin, 103, 126, 161.
Dwarf closets, 100, 160.
,, wainscoting, 136.
,, walls, 375, 384.
Dynamics (neglect of), 71.

EARTH closets, 396.
Eaves gutter (lead), 259.
Eaves guttering, 90, 105, 139, 164, 175, 209, 215, 317, 333, 372, 381, 385.
Electric bells, 303.
Embossed glass, 299.
End wall, 191.
Enrichments (plaster), 275.
Entablatures, 65.
Entrance doors, 291.
,, passage, 186.
Equipose in construction, 37.
Exactness, 1.
Excavating, 166.
External doors, 87, 136, 226.
,, walls, 375.
,, basement steps, 243.
Extra brickwork, 150, 168, 180, 193, 306, 351.
Extra fir timber, 161, 174, 187, 200.
,, fittings (carpenter), 137.
,, iron-work in straps, bolts, &c., 200.
Extra wrought-iron ties, 138.

FACINGS, 76, 93, 110, 130, 211, 234, 280, 365, 375.
Fanlights, 101, 124, 290, 299.
Faulty arches, 61.
Felt, 347.
Fence walls, 78.
Fences, 88, 371.
Filleting, 82, 211, 366.
Fillets on backs of rafters, 342.
Filling in ground, 75.
Fire-places, 285.
First-floor (glazier), 299.
Fitting (smith), 343.
Fittings (re-instatement of), 187.
Fix ironwork, 341.
Fixed sashes, 300.
Flashings, 105, 163, 175, 188, 208, 317, 333, 343, 380, 398.
Flats, 134, 138, 184, 188, 209, 269, 326, 332.
Flatting, 165, 176, 189, 318, 334.
Flint-work, 350.
,, repair, 350.
Floated ceilings, 104.
Floor-joists, 97, 117, 170.
Floors, 183, 289.
Flowers, 257.
Flues, 281, 287, 337, 376.
Folding doors, 100.
Footings, 375.
Foundation brickwork, 234.
Foundations, 12.
Four times in oil colour, 165, 176, 189, 318, 334, 344, 372, 402.
Framed partitions, 120, 136, 157, 198, 221.
French casements, 123.
,, polish, 300.
Fronts, 191.
Funnel pipes, 401.
Furring, 206.

GALLERY (school), 369.
Gate piers, 233, 234, 235.
Gates, 236, 122.
Gauged arches, 76, 109, 129, 150, 217, 390.
Gauged stuff, 331.
General brickwork, 76, 92, 129, 149, 217, 241, 283, 304, 337, 364.
General clauses, 2.
,, repairs, 186.
,, walling, 223.
Generally (bricklayer), 283.
,, (carpenter), 286, 288.
Geometrical science, 33.
,, (glazier), 299.
,, (mason), 376.

Geometrical (painter), 300.
,, (plumber), 299.
Girders, 103, 137.
Glazier, 91, 107, 140, 177, 216, 222, 279, 299, 344.
Gothic arches (excellence), 54.
,, (defects), 56.
Graining, 165.
Granite, 19.
Granite sill, 112, 131, 151, 181.
,, templates, 180.
Grates, 90, 103, 126, 164, 189, 215, 228, 259, 274, 317.
Grating (sink), 380.
Gravel work, 364.
Gravity (action of), 63.
,, 42.
Grooves and fillets, 307.
Ground and first-floor sashes, 290.
,, floor (glazier), 299.
,, flooring, 84, 116, 133, 155, 213, 220, 247, 268, 310, 324, 369.
Ground-glass, 165.
,, work, 75, 223.
Grounds, 272.
Grouting, 94, 130, 151, 338.
Gutters, &c., 89, 105, 119, 138, 157, 163, 207, 215, 228, 249. 269, 298, 316, 343, 372.

HALF rod extra brickwork, 78.
Half round coping, 232.
Hartley's glass, 300.
Hearths and slabs, 81, 96, 114, 153, 244, 265, 285, 308, 323, 376.
Herring-bone strutting, 84.
Hinge stones, 235.
Hinges (wrought-iron), 343, 380.
Hips and ridges (lead), 163, 296, 308, 317, 403.
Hips and ridges (slate), 393.
Hoarding, 83, 97, 115, 133, 182, 195, 341, 360.
Holes and finishing, 81, 181.
Hollow walls, 280.
Hook stones, 233.
Hot bath, 277.
Hot-water service, 106, 399.

IMPROPER use of material, 22, 53.
Indents, 110, 148, 179, 192, 224, 357.
Injury from improper material, 23.
Internal basement steps, 243.
,, doors, 87, 100, 137, 226.
,, stone work, 264.
Iron curb and railing, 112, 401.
,, gate standards, 236.
,, grating, 401.
,, hooping, 111, 241, 401.
,, in masonry, 18.
,, in roofs, 301, 381.
,, safe (setting), 95.
,, ties, 115, 174, 246, 360.
,, work, 222, 225.
Ironmonger, 187, 200, 245, 309.
,, and brass work, 161.

JOBBING work (bricklayer), 79, 151, 169, 194.
,, ,, (carpenter), 89, 103, 162, 174, 315.
,, ,, (mason), 245.
,, ,, (painter), 177.
,, ,, (plasterer), 258.
Joints of copings, &c., 205.
Joists, 287, 394.

KEENE'S cement, 295.
Kitchen floor, 226.
,, pavement, 307.
Knife-board, 293.

LADDERS, 126.
Landing, 113, 169.
Larder fittings, 330.
Lathing, 104.
Latrine walls, 391.
,, roofs, 394.
,, seats, 395.
Laundry fittings, 399.
Lavatory, 106, 400.
Laying on water, 90, 106, 164.
Lead rain-water-pipe, 276.
,, ridge, 229.
,, work (take off), 163.
Level foundations, 336.
Lightning conductor, 355.
Lime whiting, 104, 112, 215, 218, 242, 276, 332, 351, 367, 392.
Linings to shops, 99.
Lintels, 84, 115, 171, 184, 226, 246, 288, 309, 324, 369, 377.
Loft door, 116.

Louvre boards, 354.
L. p., 256.
L. p. & w., 257, 371, 402.
L. p. f. s., 188, 257, 275, 315, 331, 343.
L. p. f. s. & w., 127, 222, 227.
L. p. s., 138, 188, 214.

MAHOGANY handrail, 273.
Mahogany sashes, 270.
Make good old walls, 350.
,, ,, work, 240.
Making good (plasterer), 175.
,, ,, with cement, 148.
,, up ground, 364.
Mangers, 386.
Manholes, 390.
,, covers, 401.
Mantel-shelves, 101, 392.
Marble chimney-pieces, 95, 308.
,, mosaic, 284.
,, shelves, 293.
Marginal references, 3.
Masonry, 13.
Materials, 8.
,, (bricklayer), 169.
,, (carpenter), 132, 154, 174, 182, 286.
Mechanical knowledge, 7.
,, trussing, 45.
Milled lead, 139.
Mode of doing the work (bricklayer), 79, 94, 130, 151, 180, 194, 233, 307, 321, 339.
Modelling, 257.
Modern brickwork, 30.
Mortar, 79, 94, 130, 151, 180, 194, 218, 233, 280, 306, 321, 358, 375, 383.
Moulded bricks, 280, 338, 375.

NAILS, bond, &c. (slater), 245, 368.
Nave seats, 342.
New ceilings and strings, 201.
,, fronts, 179.
,, materials (carpenter), 82, 97, 114, 195, 245, 309, 347, 359, 368.
New roof, 347.
Newcastle glass (best), 260, 277, 318, 334.
Newcastle glass (second), 165, 189, 260, 318, 334, 373.
Niches, brick, 283.
Notice, &c., to district surveyor, 75, 108, 128, 147, 178, 190, 238, 363.

OFFICE fittings, 330.
Office roofs, 378.
Old bricks, 238.
,, drains, 193.
,, flooring, 361.
,, glazing, 361.
,, materials, 356, 360.
,, plastering, 201.
,, timber, 115, 246, 309, 346
,, windows, 312.
One-pair flooring, 84, 116, 156, 212, 220, 226, 248, 325.
Operative machinery, 7.
Ordinary park-wall coping, 232.
Outer doors, 172.
Outside facing, 281.

PAINTER, 90, 106, 140, 209, 222, 228, 236, 259, 355, 380, 402.
Painter and stainer, 362.
Palisading, 235.
Paperhanger, 91, 107, 318, 335, 402.
Parapets, 203, 345.
Partitions, 288, 369.
,, (boarded), 197, 399.
Party walls, 109, 190, 204.
Paving, 81, 93, 96, 114, 129, 132, 152, 170, 180, 192, 195, 211, 218, 242, 376, 383, 391.
P. c. skirting, 296.
Pier caps, 234, 393.
Piers, 77, 129, 150, 210, 218, 224, 242, 262, 306, 321, 337, 358, 366.
Pilasters, 250.
Pipe casing, 102, 292.
Pipes, 400.
Pitch pine, 394.
Plate-glass, 165, 189, 260, 277.
Plate-rack, 103, 274.
Plates, 170, 341, 396.
Plinths, 384.
Plumber (church), 355
Point old joints, 242.
Pointing, 150, 152, 179, 233, 308, 323, 376.
Portland stone chimney-pieces, 96, 308.
Posts, 385.
Practical building, 8.
Preparation (painter), 164, 189, 318, 334.
Preparation (paperhanger), 335.
Present back wall, 168.
,, basement, 168.
,, materials, 154.

Principal staircase (wood), 273, 314, 329.
Private door, 100.
Public paving, 114, 132, 181.
Pugging, 256, 288.
Pulling down, 108, 166, 345, 356, 382.
Pulpit (repair), 361.
Pumps, 317, 334, 372, 380.
Purbeck steps, 352.

QUALITY of facers, 280.
Quality of timber, 207.
Quality of stone, 80, 339.
Quantity of material, 21.
Quarry glazing, 344, 355, 362.
Quartered partitions, 85, 89, 99, 119, 136, 157, 184, 226, 249, 311, 327.
Quoin stones, 351.

RAIN-WATER-CISTERN, 78.
Rain-water-pipes, 90, 104, 139, 188, 208, 215, 228, 259, 277, 298, 317, 333, 343, 372.
Rain-water-tank, 282, 306.
Ram, 279.
Rectify damage (mason), 340.
Remove garden wall, 238.
,, old party walls, 92.
,, window, 357, 359.
,, wall, 389.
Render and set, 138, 201, 215, 222, 332.
,, float, and set, 104, 227, 258, 294, 316, 331.
Render, set, and colour, 258, 372.
Rendering, 89, 175, 188.
Repair adjoining roofs, 180.
,, brickwork, 178, 204, 390.
,, buttress, 352.
,, dormers, 197.
,, flooring, 247.
,, ground-story, 168.
,, leadwork, 208.
,, old cottage, 388.
,, old fittings, 200.
,, paving, 394.
,, plastering, 162.
,, quartered partitions, 200.
,, roofing, 351.
,, stonework, 353.
,, tiling, 204.
Repairs, cleaning, &c. (glazier), 189, 260.
Reparation (bricklayer), 95, 111, 128, 130, 339, 345, 392.
Reparation (mason), 267.
,, (slater), 82, 245, 308, 324, 341.
Repose, 37.
Resources, 73.
Revolving shutters, 99.
Re-work, re-set, and make good old copings, &c., 205.
Ridge tiles, 341, 379, 385.
Ridges and hips, 207, 298.
Rolled girders, 301.
Roof scantlings, 85, 97, 134, 220, 226, 248, 268.
Roof trap, 287.
Roofs, 85, 118, 156, 170, 197, 206, 213, 287, 310, 326, 341, 354, 360, 377, 394.
Roofs and gutters, 57.
,, and floors, 286.
,, ventilation, 394.
Roses (in gutters), 277.
Rough arches, 93, 129, 150, 223, 304, 337.
Rubbed and gauged arches, 241.
,, steps, 322.
Rubbish, 180, 190, 304, 336, 351, 359, 363.

SADDLE-BACK coping-tiles, 232.
Saddle bars, 342.
Samples, 79.
Sash doors, 172.
Sashes, 86, 101.
Scaffolding, 112, 199, 307, 337, 349, 367.
Scotia, 396.
Seats, desks, and gallery, 378.
Selenetic, 398.
Servants' stairs, 285.
Service pipes, 106.
Set stoves and ranges, 77.
Setting and hoisting, 392.
,, fire-places, 96, 282.
Shelves, 101, 123, 397.
Shop, &c., 173.
,, front, 98, 124, 158, 173, 176, 185.
Shoring, 83, 133, 154, 360.
Shutter, 101, 221, 254, 271, 290, 312, 327.
Sills, 393.
Sinks, 81, 96, 106, 114, 132, 152, 169, 212, 215, 219, 225, 285, 308, 318, 322, 330, 333, 367, 376, 384, 397.

Sink-stones, 245.
Skirtings, 86, 99, 123, 136, 158, 172, 175, 186, 198, 214, 215, 221, 222, 226, 250, 311, 327, 369, 395.
Skylight, 197, 287, 288, 289, 299.
Slabs, 96, 152, 219.
Slate battens, 207, 394.
Slate fittings, 296.
,, shelves, 293.
Sleeper walls, 282.
Sliding shutters, 312.
Smith, 301.
Soil-pipe, 298.
Sound boarding, 248.
Splays, 218, 366, 391.
Spur pieces, 234.
Square stone, 20.
Stable fittings, 126, 221.
Stain and varnish, 402.
Stained glass, 277, 334.
Staining, 344.
Staircase, 88, 102, 125, 137, 160, 172, 186, 199, 220, 227, 251, 371, 378, 394.
Staircase, turret, 352.
,, window, 300.
Stall board, 174.
,, divisions, 386.
Step flashings, 105, 208, 298, 333, 343, 398.
Steps, 80, 112, 212, 219, 225, 251, 264, 284, 307, 367, 376.
Steps and landing, 243.
Stone cover to staircase, 352.
,, dressings, 95, 131, 263.
,, floors, 393, 394.
,, staircase, 243.
,, templates, 373.
,, walling, 322, 357.
Stone, good and bad, 19.
Stop-holes, 350.
Store-closet, 293, 397.
Storey posts, 116, 198.
Stoves and ranges, 381, 390.
String, 352.
Strip-slating, 206.
,, tiling, 205.
Structural strength, 67.
Strutting, 288.
Stucco, 127, 275.
Study doors, 292.
Sundries, 154, 276.
,, (carpenters), 83, 103, 133, 182, 246, 309, 368, 378.
Sundries (mason), 245, 308, 323.
,, (plasterer), 105, 316, 332.
Superfluous earth, 374.
Sureties, 6.
Syphons, 400.

TAKE off old lead, 207.
Take off roof, 355.
Take off timbers, 346.
Taking down, 147, 178, 217, 304.
,, ,, tower, 349.
Tanks, 383.
Taps, 400.
Tarpaulings, 345.
Templates, 285.
Terra cotta shafts, 280.
Terraces, 279.
Testing water service, 106.
Thresholds, 384.
Tie, 38.
Ties, &c., 103, 280, 316, 331, 400.
Tile crestings, 77, 110, 131, 149, 391.
,, lining, 283.
,, pavement, 224, 283, 338, 358, 367, 392.
Tiling, 192, 211, 218, 358, 379, 385.
Tilting fillets, 342.
Timber and deal, 83, 132, 154, 245.
Timber partitions, 59.
Traps to cistern, 397.
Trenches, 279.
,, for drains, 76.
Trimmer arches, 77.
Trowelled stucco, 104, 161, 175, 295 315, 331, 361.
Trusses, 326.
Turret, 380.
Twice in oil colour, 165, 189.

UNCUT arches, 109.
Underpinning, 148, 191.
Union of great principles of construction, 41.
Urinal, 297, 401.

VALLEYS, 208.
Vane, 354, 381.
Vaults, 149, 261.
Vegetable soil, 279.
Ventilating drains, 391.
Ventilation, 77, 358, 365, 391.

Verandah floors, 243.
Verandahs, 255.

WAINSCOTING, 311.
Wainscot sashes, 270.
Walling, 382.
Wallplates and templates, 118, 196, 287.
Walls in selenetic, 398.
Warm bath, 273.
Wash and stop, 188.
,, basins, 292.
Waste-pipe, 90, 139, 176, 228, 372.
Water, 75.
Water-butt, 215.
,, closet apparatus, 90.
,, closet doors, 292.
,, closets, 88, 102, 105, 126, 161, 164, 167, 173, 176, 251, 259, 297, 315, 329, 333, 396, 400.
Water service, 297, 337.
,, tablings, 352.
,, waste preventor, 106.
,, ,, supply, 399.
Well, 321, 364, 375.
Whiting, 163, 188, 202, 215, 276, 316, 332.
Window guards, 125, 301.
Window linings, 214, 254.
,, sills, 80, 95, 113, 152, 169, 180, 212, 244, 284.
Windows, 86, 101, 135, 159, 171, 185, 199, 254, 271, 365, 369, 379, 396.
Wood-bricks, 83, 97, 115, 133, 184, 196, 212, 225, 246, 309, 324, 377.
Wood fencing, 88.
,, block flooring, 395.
Wood floors, 342, 377, 395.
,, work, general repairs, 161.
Wrought timber, 310.

YORK sills, 284.
,, paving, 322.

ZINC ventilators, 401.

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